

**CITY OF NEWTON
PURCHASING DEPARTMENT**

PROJECT FOR PUBLIC BUILDINGS DEPARTMENT

**PROJECT MANUAL:
VARIABLE FREQUENCY DRIVE REPLACEMENT
AT NEWTON FREE LIBRARY**

INVITATION FOR BID #10-07

Plans and Specifications
Prepared by:
RDK ENGINEERS
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AUGUST 2009

David B. Cohen, Mayor

CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT

purchasing@newtonma.gov

Fax (617) 796-1227

AUGUST 11, 2009

INVITATION FOR BID #10-07

**VARIABLE FREQUENCY DRIVE REPLACEMENT
AT NEWTON FREE LIBRARY**

CITY OF NEWTON

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**VARIABLE FREQUENCY DRIVE REPLACEMENT
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Bid# 10-07

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DRAWINGS – 7 PAGES *PLANS CAN BE OBTAINED THROUGH RDK ENGINEERS.*

(Call 978-475-0298 or email lferreira@rdkengineers.com for availability)

**CITY OF NEWTON
PURCHASING DEPARTMENT
INVITATION FOR BID #10-07**

The City of Newton invites sealed bids from Contractors for

**VARIABLE FREQUENCY DRIVE REPLACEMENT
AT NEWTON FREE LIBRARY**

Pre-bid will be held on site at: **10:00 a.m., August 19, 2009 at 330 Homer Street, Newton, MA**

Bids will be received until **10:00 a.m., September 2, 2009**
at the Purchasing Department, Room 204, Newton City Hall, 1000 Commonwealth Ave., Newton, MA 02459.
Immediately following the deadline for bids all bids received within the time specified will be publicly opened and read aloud.

Work under this contract shall consist of: removal and replacement of the variable frequency drive at the Newton Free Library. **Work is expected to begin on September 12, 2009 and shall be completed within 120 calendar days.**

Contract Documents will be available **online at the City's website: www.ci.newton.ma.us/bids** or for pickup at RDK Engineers, 200 Brickstone Square, Andover, Massachusetts 01810 or after: **8:00 a.m., August 12, 2009.**
There will be \$100 refundable fee (Certified Bank Check) for contract documents, and \$30.00 non-refundable mailing fee.

All General Bids must be accompanied by a copy of a "Certificate of Eligibility" (DCAM Form CQ-7) issued by the Department of Capital Asset Management and Maintenance (DCAM) and a "Contractor Update Statement" (DCAM Form CQ-3). The category of work for which the Bidder must certify is: **Mechanical Systems**

Award will be made to the bidder with the lowest total contract price, including any accepted alternates, that has been deemed responsible and eligible. **All bids shall be submitted as one ORIGINAL and one COPY.**

All bids must be accompanied by a bid deposit in an amount that is not less than five percent (5%) of the value of the bid, including all add alternates. Bid deposits, payable to the City of Newton, shall be either in the form of a bid bond, or cash, or a certified check, or a treasurer's or cashier's check issued by a responsible bank or trust company.

All bids are subject to the provisions of M.G.L. Chapter 149, Section 44 A-J. Wages are subject to minimum wage rates determined by the Massachusetts Department of Labor and Industries pursuant to M.G.L. Chapter 149, Sec. 26 to 27H. The schedule of wage rates applicable to this contract is included in the bidding documents. In addition, the prevailing wage schedule will be updated annually for all public construction projects lasting longer than one (1) year. You will be required to pay the rates set out in any updated prevailing wage schedule. Increases in prevailing wage schedules will not be the basis for change order requests. The successful bidder will be required to furnish a Performance Bond and also a Labor and Materials Bond Payment Bond each in the amount of 100% of the contract total.

Bidders attention is directed to the requirements of the City of Newton Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program and also to the Minority/Women Business Enterprise Plan, December 1999, all of which are hereby incorporated into the Contract Documents. In the event of conflict between any of the above listed policies, the stricter policy shall apply.

City of Newton bids are available on the City's web site, www.ci.newton.ma.us/bids. It is the sole responsibility of the contractor downloading these bids to ensure they have received any and all addenda prior to the bid opening. Addenda's will be available online within the original bid document as well as a separate file. If you download bids from the internet site and would like to make it known that your company has done so, you may fax the Purchasing

dept. (617) 796-1227 or e-mail purchasing@newtonma.gov with your NAME, ADDRESS, PHONE, FAX AND INVITATION FOR BID NUMBER. **Obtain plans through RDK Engineers.**

The City of Newton reserves the right to waive any informalities in any or all bids, or to reject any or all bids, if it be in the public interest to do so.

CITY OF NEWTON

Re Cappoli
Chief Procurement Office

July 1, 2009

CITY OF NEWTON
DEPARTMENT OF PURCHASING
INSTRUCTIONS TO BIDDERS

ARTICLE 1 – BIDDER’S REPRESENTATION

- 1.1. Each General Bidder (hereinafter called the “Bidder”) by making a bid (hereinafter called “bid”) represents that:
- 1.2. The Bidder has read and understands the Contract Documents and the bid is made in accordance therewith.
- 1.3. The Bidder has visited the site and is familiar with the local conditions under which the Work has to be performed.
- 1.4. Failure to so examine the Contract Documents and site will not relieve any Bidder from any obligation under the bid as submitted.

ARTICLE 2 - REQUEST FOR INTERPRETATION

- 2.1 Bidders shall promptly notify the City of any ambiguity, inconsistency, or error which they may discover upon examination of the Contract Documents, the site, and local conditions.
- 2.2 Bidders requiring clarification or interpretation of the Contract Documents shall make a written request to [doleary@rdkengineers](mailto:doleary@rdkengineers.com), *RDK Engineers* or via facsimile 978-296-6294. RDK will answer such requests if received seven (7) calendar days before the date for receipt of the bids.
- 2.3 Interpretation, correction, or change in the Contract Documents will be made by Addendum which will become part of the Contract Documents. The City will not be held accountable for any oral instruction.
- 2.4 Addenda will be faxed or mailed First Class postage by the USPS, to every individual or firm on record as having taken a set of Contract Documents.
- 2.5 Copies of addenda will be made available for inspection at the location listed in the Invitation for Bids where Contract Documents are on file, in addition to being available online at www.ci.newton.ma.us/bids.
- 2.6 Bidders downloading information off the internet web site are solely responsible for obtaining any addenda prior to the bid opening. If the bidder makes themselves known to the Purchasing Dept., at purchasing@newtonma.gov or via facsimile (617) 796-1227, they shall be placed on the bidder’s list. Bidders must provide the Purchasing Dept. with their company’s name, street address, city, state, zip, phone, fax and **INVITATION FOR BID NUMBER# 10-07**.

ARTICLE 3 – MBE PARTICIPATION

- 3.1 Notice is hereby given that the Mayor’s Affirmative Action Plan for the City of Newton, dated December 1999 is applicable to all construction contracts in excess of \$10,000.00. A copy of this plan is on file at City of Newton Purchasing Department.
- 3.2 Notice is hereby given that the City of Newton Minority/Women Business Enterprise Plan dated December 1999 and the Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action

Program is applicable to all City contracts for goods and services in excess of \$50,000.00. Copies of these plans are incorporated in the bidding documents.

ARTICLE 4 – PREPARATION AND SUBMISSION OF BIDS

- 4.1 Bids shall be submitted on the “Bid Form” as appropriate, furnished by the City.
- 4.2 All entries on the Bid Form shall be made by typewriter or in ink.
- 4.3 Where so indicated on the Bid Form, sums shall be expressed in both words and figures. Where there is a discrepancy between the bid sum expressed in words and the bid sum expressed in figures, the words shall control.
- 4.4 Bid Deposits shall be submitted in the amount specified in the Invitation for Bids. They shall be made payable to the City of Newton and shall be either in the form of cash, certified check, treasurer’s or cashier’s check issued by a responsible bank or trust company, or a bid bond issued by a surety licensed to do business in the Commonwealth of Massachusetts; and shall be conditioned upon the faithful performance by the principal of the agreements contained in the bid.

Bid deposits of the three (3) lowest responsible and eligible Bidders shall be retained until the execution and delivery of the Owner/Contractor agreement.

- 4.5 The Bid, including the bid deposit shall be enclosed in a sealed envelope with the following plainly marked on the outside: GENERAL BID FOR:

NAME OF PROJECT AND **INVITATION NUMBER**

BIDDER’S NAME, BUSINESS ADDRESS, AND PHONE NUMBER

Date and time for receipt of bids is set forth in the Invitation for Bids.

- 4.6 Timely delivery of a bid at the location designated shall be the full responsibility of the Bidder.
- 4.7 Bids shall be submitted with one **original** and one **copy**.
- 4.8 Be advised that a new Massachusetts law has been enacted that required all employees who work on Massachusetts public works construction sites must have no less than 10 hours of OSHA-approved safety and health training. See Chapter 306 of the Acts of 2004, which will become effective July 1, 2006.
 - 1. This requirement will apply to any general bid or sub bid submitted on or after July 1, 2006 and to any contract awarded on or after July 1, 2006.
 - 2. This law directs the Massachusetts Attorney General to restrain the award of construction contracts to any contractor who is in violation to this requirement and to restrain the performance of these contracts by non-complying contractors.
 - 3. The contractor and all subcontractors on this project will be required to provide certification of compliance with this requirement. Non-compliance with this new Massachusetts Law will disqualify you from bidding on public contracts.

ARTICLE 5 – ALTERNATES

- 5.1 Each Bidder shall acknowledge Alternates (if any) in Section C on the Bid Form.
- 5.2 In the event an Alternate does not involve a change in the amount of the base bid, the Bidder shall so indicated by writing “No Change”, or “N/C” or “0” in the space provided for that Alternate.

5.3 Bidders shall enter on the Bid Form a single amount for each Alternate which shall consist of the amount for work performed by the Contractor.

5.4 The low Bidder will be determined on the basis of the sum of the base bid and the accepted alternates.

ARTICLE 6 – WITHDRAWAL OF BIDS

6.1 Any bid may be withdrawn prior to the time designated for receipt of bids on written or telegraphic request. Telegraphic withdrawal of bids must be confirmed over the Bidder's signature by written notice postmarked on or before the date and time set for receipt of bids.

6.2 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids.

6.3 No bids shall be withdrawn within thirty days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids.

ARTICLE 7 – CONTRACT AWARD

7.1 The City of Newton will award the contract to the lowest eligible and responsible Bidder within thirty days, Saturdays, Sundays, and legal holidays excluded after the opening of bids.

7.2 The City of Newton reserves the right to waive any informalities in or to reject any or all Bids if it be in the public interest to do so.

7.3 As used herein, the term "lowest responsible and eligible Bidder" shall mean the Bidder (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (3) who, where the provisions of section eight B of chapter twenty-nine apply, shall have been determined to be qualified thereunder.

7.4 Subsequent to the award and within five (5) days, Saturday, Sundays and legal holidays excluded, after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the City a Contract in the form included in the Contract Documents in such number of counterparts as the City may require.

7.5 In the event that the City receives low bids in identical amount from two or more responsive and responsible Bidders, the City shall select the successful Bidder by a blind selection process such as flipping a coin or drawing names from a hat. The low Bidders who are under consideration will be invited to attend and observe the selection process.

ARTICLE 8 – TAXES

8.1 The Bidder shall not include in this bid any tax imposed upon the sale or rental of tangible personal property in this Commonwealth, such as any and all building materials, supplies, services and equipment required to complete the work.

8.2 The City is exempt from payment of the Massachusetts Sales Tax, and the Bidder shall not include any sales tax on its bid. The City's exemption Number is E-046-001-404.

END OF SECTION

**CITY OF NEWTON
FORM FOR GENERAL BID # 10-07**

**VARIABLE FREQUENCY DRIVE REPLACEMENT
AT NEWTON FREE LIBRARY**

TO THE AWARDING AUTHORITY:

A. The undersigned proposes to furnish all labor and materials required for variable frequency drive & related equipment removal and replacement in Newton, Massachusetts in accordance with the accompanying plans and specifications prepared by the City of Newton for the contract price specified below, subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda number(s) _____, _____, _____, _____,

C. The proposed contract price is:

_____ DOLLARS (\$_____)

For Alternate No. N/A Add \$ _____; Subtract \$ _____

COMPANY: _____

The sub-division of the proposed contract price is as follows:

Item 1. The work of the General Contractor, being all work other than that covered by Item 2

Total of Item 1: \$ N/A

Item 2. Sub-bids as follows:

Sub-Trade	Name of Sub-bidder	Amount	Bond Required ? (Yes or No)
<u>N/A</u>	<u>N/A</u>	\$ <u>N/A</u>	<u>N/A</u>

Total of Item 2: \$ N/A

The undersigned agrees that each of the above named sub-bidders will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidders as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1 of this bid.

The undersigned agrees that if s/he is selected as general contractor, s/he will promptly confer with the awarding authority on the question of sub-bidders; and that the awarding authority may substitute for any sub-bid listed above a sub-bid filed with the awarding authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respective sub-bids and be in every way as responsible for them and their work as if they had been originally named in this general bid, the total contract price being adjusted to conform thereto.

D. The undersigned has completed and submits herewith the following documents:

☐ DCAM Certificate of Eligibility, Form CQ 7 (Supplied by Bidder)

☐ DCAM Update Statement, Form CQ-3, (Supplied by Bidder)

☐ Bid Form (2 pages)

☐ Original bid and one COPY

- E. The undersigned agrees that, if s/he is selected as general contractor, s/he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.

The undersigned hereby certifies that s/he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that s/he will comply fully with all laws and regulations applicable to awards made subject to section forty-four A of M.G.L. Chapter 30, s 39M.

The undersigned certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration ("OSHA") that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States OSHA that is at least 10 hours in duration. The undersigned understands that any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

The undersigned further certifies that s/he intends to comply with the City of Newton Minority/Women Business Enterprise Plan, dated December 19, 1999 to further expand business opportunities for minority firms.

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date : _____

(Name of General Bidder)

BY: _____
(Signature)

(Printed Name and Title of Signatory)

(Business Address)

(City, State Zip)

(Telephone) / _____
(FAX)

E-mail address (optional)

NOTE: If the bidder is a corporation, indicate state of incorporation under signature, and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF SECTION

CONTRACT FORMS

The forms are provided for informational purposes only.

The awarded bidder will be required to complete and submit the following documents in order to execute a contract pursuant to this bid.

None of the following forms are required at the time of bid submittal.

OWNER-CONTRACTOR CONTRACT

CONTRACT NO. C _____

THIS AGREEMENT made this ____ day of _____ in the year Two Thousand and Eight by and between the CITY OF NEWTON, a municipal corporation organized and existing under the laws of the Commonwealth of Massachusetts, hereinafter referred to as the CITY, acting through its Chief Procurement Officer, but without personal liability to him, and

hereinafter referred to as the CONTRACTOR.

WITNESSETH, that the parties hereto for the consideration hereinafter set forth agree as follows:

ARTICLE 1. STATEMENT OF WORK. The Contractor shall furnish all labor, materials, equipment and insurance, and perform all work required in strict accordance with the Project Manual entitled:

**Variable Frequency Drive Replacement
At Newton Free Library**

hereinafter referred to as the SPECIFICATIONS, and the Addenda thereto numbered _____, and all the Drawings referred to therein.

The said Specifications, Addenda and Drawings are incorporated herein by reference and are made a part hereof.

ARTICLE 2. TIME OF COMPLETION. The Contractor shall commence work under this Contract on the date specified in the written notice of the City to proceed and shall fully complete all work hereunder within the time (120 calendar days) stated elsewhere in the contract documents.

ARTICLE 3. THE CONTRACT PRICE. The City shall pay the Contractor pursuant to and in accordance with the provisions set forth in the Contract Documents, subject to additions and deductions in accordance with the terms of the Specifications, for the full and satisfactory performance of the Contract the sum of:

ARTICLE 4. CONTRACT DOCUMENTS. The Contract shall consist of the following component parts, copies of which are attached hereto:

- a. The City's Invitation for bid # 09-120 issued by its Purchasing Department;
- b. Project Manual for VARIABLE FREQUENCY DRIVE REPLACEMENT AT NEWTON FREE LIBRARY
- c. Addenda Numbers ____ to the above referenced Project Manual and/or Plans;
- d. The bid of _____ dated _____ and signed by _____, including the Bid Form and Bidder's Qualifications Form and References;

e. Attestation/Certification

This Contract Form, together with the other documents enumerated in this Article 4 form the Contract.

ARTICLE 5. ALTERNATES. The following Alternates have been accepted and their costs are included in the Contract Price stated in Article 3 of this Agreement:

Alternates: _____.

ARTICLE 6. APPLICABLE STATUTES. All applicable federal, state and local laws and regulations are incorporated herein by reference and the Contractor agrees to comply with same.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed under seal the day and year first above written.

CONTRACTOR

By _____
Title _____

Date _____

Affix Corporate Seal Here

City funds in the amount of \$130,000.00
are available in account number
31L115A1-5825

I further certify that the Mayor is
authorized to execute contracts and
approve change orders

By _____
Comptroller of Accounts

Date _____

CITY OF NEWTON

By _____
Chief Procurement Officer

Date _____

By _____
Commissioner of Public Buildings

Date _____

Approved as to Legal Form and
Character

By _____
Associate City Solicitor

Date _____

CONTRACT AND BONDS APPROVED

By _____
David B. Cohen, *MAYOR*

Date _____

CERTIFICATE OF AUTHORITY – CORPORATE

1. I hereby certify that I am the Clerk/Secretary of _____
(insert full name of Corporation)
2. corporation, and that _____
(insert the name of officer who signed the **contract and bonds.**)
3. is the duly elected _____
(insert the title of the officer in line 2)
4. of said corporation, and that on _____
(insert a date that is ***ON OR BEFORE*** the date the officer signed the **contract and bonds.**)

at a duly authorized meeting of the Board of Directors of said corporation, at which all the directors were present or waived notice, it was voted that

5. _____ the _____
(insert **name** from line 2) (insert **title** from line 3)

of this corporation be and hereby is authorized to execute contracts and bonds in the name and on behalf of said corporation, and affix its Corporate Seal thereto, and such execution of any contract of obligation in this corporation's name and on its behalf, with or without the Corporate Seal, shall be valid and binding upon this corporation; and that the above vote has not been amended or rescinded and remains in full force and effect as of the date set forth below.

6. ATTEST: _____
(Signature of **Clerk or Secretary**)* *AFFIX CORPORATE SEAL HERE*
7. Name: _____
(Please print or type name in line 6)*
8. Date: _____
(insert a date that is ***ON OR AFTER*** the date the officer signed the **contract and bonds.**)

*The name and signature inserted in lines 6 & 7 **must** be that of the **Clerk or Secretary** of the corporation.

ATTESTATION

Pursuant to MG c. 62C, § 49A, the undersigned acting on behalf of the Contractor, certifies under the penalties of perjury that, to the best of the undersign's knowledge and belief, the Contractor is in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.*

**Signature of Individual
or Corporate Contractor (Mandatory)

*** Contractor's Social Security Number
(Voluntary) or Federal Identification Number

By: _____
Corporate Officer
(Mandatory, if applicable)

Date: _____

* The provision in the Attestation relating to child support applies only when the Contractor is an individual.

** Approval of a contract or other agreement will not be granted unless the applicant signs this certification clause.

*** Your social security number will be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing or tax payment obligations. Providers who fail to correct their non-filing or delinquency will not have a contract or other agreement issued, renewed, or extended. This request is made under the authority of GL c. 62C, § 49A.

CITY OF NEWTON, MASSACHUSETTS

PERFORMANCE BOND

Know All Men By These Presents:

That we, _____, as PRINCIPAL, and _____
, as SURETY, are held and firmly bound unto the City of Newton as Obligee, in the sum of
dollars (\$_____) to be paid to the Obligee, for which payments well and truly to be made, we
bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly
by these presents.

Whereas, the said PRINCIPAL has made a contract with the Obligee, bearing the date of _____, 2008
for the construction of _____ in
Newton, Massachusetts. (Project Title)

Now, the condition of this obligation is such that if the PRINCIPAL and all Sub-contractors under said
contract shall well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of
said contract on its part to be kept and performed during the original term of said contract and any extensions thereof
that may be granted by the Obligee, with or without notice to the SURETY, and during the life and any guarantee
required under the contract, and shall also well and truly keep and perform all the undertakings, covenants,
agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to
said contract that may hereafter be made, notice to the SURETY of such modifications, alterations, changes or
additions being hereby waived, then this obligation shall become null and void; otherwise, it shall remain in full
force, virtue and effect.

In the event, that the contract is abandoned by the PRINCIPAL, or in the event that the Obligee terminates
the employment of the PRINCIPAL or the authority of the PRINCIPAL to continue the work said SURETY hereby
further agrees that said SURETY shall, if requested in writing by the Obligee, take such action as is necessary to
complete said contract.

In Witness Whereof, the PRINCIPAL and SURETY have hereto set their hands and seals this ____ day of
____ 2008.

PRINCIPAL

SURETY

BY _____

(SEAL)

(Title)

ATTEST: _____

BY _____
(ATTORNEY-IN-FACT) (SEAL)

ATTEST: _____

CITY OF NEWTON, MASSACHUSETTS

PAYMENT BOND

Know All Men By These Presents:

That we, _____, as PRINCIPAL, and _____
, as SURETY, are held and firmly bound unto the City of Newton as Obligee, in the sum of
_____dollars (\$_____) to be paid to the Obligee, for which payments well and truly to be made, we
bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly
by these presents.

Whereas, the said PRINCIPAL has made a contract with the Obligee, bearing the date of _____, 2008
for the construction of _____ in
Newton, Massachusetts. (Project Title)

Now, the conditions of this obligation are such that if the PRINCIPAL and all Sub-contractors under said
contract shall pay for all labor performed or furnished and for all materials used or employed in said contract and in
any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that
may hereafter be made, notice to the SURETY of such modifications, alterations, extensions of time, changes or
additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to,
provisions of M.G.L. c. 30, sec. 39A, and M.G.L. c. 149 sec. 29, as amended, then this obligation shall become null
and void; otherwise it shall remain in full force, virtue and effect.

In Witness Whereof, the PRINCIPAL and SURETY have hereto set their hands and seals this ____day of____
2008.

PRINCIPAL

SURETY

BY _____

BY _____

(SEAL)

(ATTORNEY-IN-FACT) (SEAL)

(Title)

ATTEST: _____

ATTEST: _____

GENERAL CONDITIONS OF THE CONTRACT FOR NON-TECHNICAL SERVICES

The City of Newton, herein referred to as the City, does hereby establish the following General Conditions, applicable to this Invitation for Bids and any subsequent purchase order, work order, work order or contract resulting therefrom.

1.0 SCOPE OF SERVICES

- 1.1 The Contractor agrees to furnish all labor, materials, equipment and insurance necessary to perform and fully complete, in every respect, within the time frame herein specified, all work (hereinafter referred as the Services) described in the Project Manual.
- 1.2 The Contractor shall not make any changes in the scope of Services without the prior written consent of the City. The Contractor shall make reasonable revisions or corrections, within the scope of Services, to any work performed until submitted in a form acceptable to the City.
- 1.3 The City reserves the right to alter, add to or reduce the Services by delivering to the Contractor written notice specifying the nature and extent of such alteration, addition or reduction. Such notice shall be effective upon the later of actual receipt by the Contractor or upon the date given in such notice. No addition to the Services shall be made unless the City and the Contractor have agreed to such increase in writing.

2.0 CONTRACT TERM

- 2.1 The obligations of the Contractor identified herein shall commence upon execution of the City-Contractor Contract and shall continue in full force and effect for the duration of the contract term as identified in the Project Manual. The contractor shall commence the performance of services under this contract promptly upon receipt of the City's Notice to Proceed in accordance with the provisions identified in the Project Manual.
- 2.2 In the event the term of this contract exceeds a period of one year and notwithstanding any provision to the contrary herein, the City shall cancel this contract in the event that funds are not appropriated or otherwise made available to support continuation of performance by the Contractor in any fiscal year succeeding the first year.

3.0 EXECUTION

- 3.1 All work required hereunder shall be performed as promptly as possible, and in any event within the time herein set forth, and such work shall be subject to approval and acceptance by the City, but such approval and acceptance shall not relieve the Contractor from the obligation to correct any incomplete, inaccurate or defective work, all of which shall be promptly remedied by the Contractor on demand, without cost to the City. The Contractor shall obtain all the required licenses and permits for the work herein described.
- 3.2 The Contractor shall conform to all determinations and directions of the City concerning the Contractor's delivery of services in the event of inclement weather, equipment failure, picket lines on City property, or labor strikes by the contractor's employees.

4.0 COMPENSATION

- 4.1 The City shall pay the Contractor for services rendered under this contract in accordance with the amount(s) set forth in the Contractor's General Bid Form and pursuant to the provisions contained in the Project Manual.

4.2 Notwithstanding anything to the contrary contained in the Contract, the City may withhold any payment to the Contractor hereunder if and for so long as the Contractor fails to perform any of its obligations hereunder or otherwise is in default under this Contract including, without limitation, any failure to perform Services in full accordance with the amount sufficient in the reasonable opinion of the City to cure any such default or failure of performance by the Contractor.

4.3 In no event shall the City be required to pay any amounts for work deemed by it to be unacceptable, or which are otherwise disputed. In the event the City disputes any such amounts invoiced, it shall pay all amounts not in dispute and notify the Contractor in writing of the amounts disputed and the reasons therefor.

4.4 No payment made shall constitute or be construed as final acceptance or approval of that part of the Services to which payment relates, or relieve the Contractor of any of its obligations outlined in this Contract. Further, the City shall not be deemed, by virtue of making payments to the Contractor hereunder, to have released the Contractor from any claim or liability, or to have waived any action arising out of the breach of this Contract by the Contractor.

5.0 REPORTS AND DRAWINGS

When the Contractor has been paid for the Services performed by him or her, all reports, drawings, and other material furnished to the City shall become the City's property and may be used by the City (or such parties as the City may designate) thereafter in such manner and for such purposes as the City (or such parties as the City may designate) may deem advisable, without further employment of or additional compensation to the Contractor. The Contractor shall not release or disclose any report, drawing, or other material furnished to the Contractor by the City in connection with the performance of the Contractor's Services

6.0 CONTRACTOR'S ACCOUNTING RECORDS

The Contractor shall keep records pertaining to Services performed (including complete and detailed time records) on the basis of recognized bookkeeping practices, generally accepted accounting principles, and in accordance with such reasonable requirements to facilitate audit as the City may provide. All records shall be available to the City or its authorized representatives for review and audit during normal business hours.

7.0 ASSIGNMENT/SUBCONTRACTING

The Contractor agrees that he will not sell, assign or transfer this Contract or any part thereof or interest therein without the prior written consent of the City.

8.0 REMEDY FOR DEFAULT

If the Contractor, in the sole judgment of the City, shall violate or fail properly to comply with or perform in any material respect any condition, provision, or warranty hereof, the City shall have the right by prior written notice to the Contractor to have the services called for hereby otherwise performed, and/or to terminate this contract without prejudice to any other rights or remedies of the City under this contract. The Contractor shall pay any excess in the City's cost to so procure the services and any related goods, supplies, materials or equipment. In addition, and without limiting any other remedies available to the City, the Contractor shall be liable for all losses, costs and expenses incurred by the City which result from the Contractor's noncompliance.

9.0 SUSPENSION OR TERMINATION

9.1 The City shall have the right, upon seven (7) days written notice to the Contractor so stating, to terminate, suspend, or postpone this contract in whole or in part for any reason deemed by the City to be in the public interest. Any such termination, suspension, or postponement shall not give rise to any cause of action for

damages against the City. In the event that the City postpones or suspends the Services, the Contractor's time for performance of the Services shall be extended for a period equal to the period of such postponement or suspension. In the event of termination, suspension or postponement, the City shall pay: (a) for services and any related goods, supplies, materials and equipment furnished up to the time of termination, suspension, or postponement at the contract price upon delivery; (b) for work in process in the amount of the Contractor's cost, determined in accordance with ordinary accepted accounting practices, up to the time of termination, suspension, or postponement; and (c) for raw materials purchased by the Contractor as of the date of termination, suspension, or postponement and which are noncancelable at the Contractor's actual cost plus reasonable handling charges, but only to the extent that such raw materials were purchased in reliance upon this contract and are useful solely with respect to this contract.

- 9.2 Upon receipt of a notice of termination, suspension, or postponement the Contractor shall immediately cease all work hereunder and cancel all orders placed with respect to this contract. The Contractor's failure to so cancel shall relieve the City of the obligations of paragraph 10.1 above.
- 9.3 The City may postpone, suspend or terminate the Services immediately, by notice, hand delivery or certified mail, if the Contractor violates any of the provisions of this Contract, or fails to perform or observe any of the terms, covenants or conditions of this Contract, or abandons in whole or in part its Services, or becomes unable to perform its Services.
- 9.4 In the event of termination of this Contract, the Contractor shall promptly deliver to the City all documents, work papers, calculations, computer programs, data, drawings, plans, and other tangible work product, or materials pertaining to the Services performed under this Contract to the time of termination.

10.0 NOTICE

Any action, notice or request required to be taken, given or made by City or the Contractor hereunder may be taken, given or made only by those persons identified for that purpose on the Contract Form. All notices required to be given hereunder shall be deemed properly given if personally delivered, or if mailed by registered or certified mail, postage prepaid addressed to the address and officer identified on the Contract Form.

11.0 PROTECTION OF PROPERTY

The Contractor shall take all reasonable precautions to prevent damage to property, visible and concealed, and shall restore to substantially the same condition existing prior to the Contractor's entry any disturbance or damage to property caused by the Contractor or any person acting under its control.

12.0 INSURANCE REQUIREMENTS

- 12.1 The Contractor shall provide insurance coverage as listed below. This insurance shall be provided at the Contractor's expense and shall be in full force and effect during the full term of this Contract.

WORKER'S COMPENSATION

Worker's Compensation: Per M.G.L. c.. 149, s. 34 and c.. 152 as amended.

GENERAL LIABILITY

Personal Injury	\$1,000,000 each occurrence
	\$3,000,000 aggregate
Property Damage	\$1,000,000 each occurrence
	\$3,000,000 aggregate

VEHICLE LIABILITY

Personal Injury	\$1,000,000 each person
	\$1,000,000 aggregate
Property Damage	\$1,000,000

12.2 **The City shall be named as additional insureds on the Contractor's Liability Policies.**

12.3 The Contractor shall not commence the work until proof of compliance with this Section 13.0 has been furnished to the City by submitting one copy of a properly endorsed insurance certificate issued by a company authorized to write insurance in the Commonwealth. This certificate shall indicate that the contractual liability coverage is in force.

12.4 The Contractor shall file the original and one certified copy of all policies with the City within fifteen (15) days after contract award. If the City is damaged by the Contractor's failure to maintain such insurance and to so notify the City, then the Contractor shall be responsible for all reasonable costs attributable thereto.

12.5 Cancellation of any insurance required by this contract, whether by the insurer or the insured, shall not be valid unless written notice thereof is given by the party proposing cancellation to the other party and City at least thirty days prior to the effective date thereof, which shall be expressed in said notice.

13.0 **CONFLICT OF INTEREST**

No member, agent or employee of the City shall , during his/her tenure or one year thereafter directly or indirectly, have any interest in any property to be included in, or any contract for property, materials or services to be furnished or used in connection with, this contract or the proceeds thereof.

14.0 **COMPLIANCE WITH LAWS**

All work to be performed and wages paid under this specification shall be in accordance with all applicable laws, state or federal, and all applicable ordinances, codes, rules, and regulations of the City of Newton, or any public board or office having any jurisdiction, regulation or control over any work to be done hereunder, including minimum wage rates. In particular, without limitation, the Contractor agrees to comply with all regulations pertaining to approvals for federal and state grants, and with all federal and state environmental laws and regulations. The Contractor agrees to assist in making any submissions to federal or state agencies as may be required in order to meet the requirements in this paragraph.

15.0 **INDEMNIFICATION**

The Contractor agrees to indemnify and save the City harmless from and against any and all costs, losses, expenses, liabilities, damages or claims for damages, including reasonable attorney's fees and expenses, on account of any injury or damage to buildings, improvements, or property of the City or on account of any injury (including death) or damage to any person, persons, firm, corporation or association, or on account of any infringement or claim of infringement of patents, arising out of or resulting from the deliveries provided for or performed under this contract or from any act, omission or negligence of the contractor, his agents, employees, or assigns. The foregoing provisions shall not be deemed to be released, waived or modified in any respect by reason of any surety or insurance provided by the contractor under contract.

16.0 **FORCE MAJEURE**

The City may not hold the Contractor liable for any loss, expense or damage incurred by the City on account of failure of the Contractor to deliver services as specified herein, if that failure is caused by state of war, acts of enemies, expropriation or confiscation of facilities used by the Contractor, or compliance with any law, order, or regulation of any federal, state or municipal governmental authority, if the Contractor shall show that such compliance would impair this ability to perform a material provision of this contract, the Contractor having given the City reasonable notice of such cause.

17.0 **DISPUTES**

All claims, disputes and other matters in question between the City and the Contractor arising out of or relating to this Contract or the breach of it, shall be submitted for resolution to a court of competent jurisdiction in Massachusetts, unless otherwise agreed by the parties. No such action shall be brought,

however, until the completion of all Services under this Contract or the earlier termination of this Contract as provided herein, the parties agreeing to negotiate any claims, disputes or other matters in question during the term of this Contract before resorting to litigation. As to all acts or failures to act by either party to this Contract, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events when the other party becomes aware or should have been aware of such acts or failure to act.

18.0 GOVERNING LAW

This contract shall be governed by and construed in accordance with Massachusetts Law.

19.0 LIABILITY

The Contractor is retained solely for the purpose of and to the extent set forth in this Contract. The Contractor's relationship to the City for the purpose of services to be performed under this Contract shall be that of an independent contractor. The Contractor shall have no capacity or authority to involve the City in any contract or to incur any liability on behalf of the City. In no event shall the City be held liable as an employer or otherwise for any personal injury to or death of the Contractor's principals, employees, agents and/or representatives occasioned by or resulting from the Contractor's performance under this Contract.

20.0 LIENS

The Contractor shall cause to be removed from the property of the City any liens or other claims asserted by any person or entity claiming through or under the Contractor and arising out of Services performed under this Contract by such third party.

21.0 SEVERABILITY

In the event that any portion of this Contract is held illegal or unenforceable by a court of competent jurisdiction, the parties agree that such invalidity shall not affect the validity of the remaining portions of this Contract and Contractor and the City agree to substitute for the invalid provision a valid provision which most closely approximates the economics and intent of the invalid provision.

END OF SECTION

**PUBLIC BUILDING MAINTENANCE CONTRACT
SUPPLEMENTAL CONDITIONS
COMMONWEALTH OF MASSACHUSETTS & CITY OF NEWTON**

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SPECIAL CONDITIONS - COMMONWEALTH OF MASSACHUSETTS

Article 1. METHOD OF PAYING SUBCONTRACTORS

(General Laws, Chapter 30, Section 39F as most recently amended by Chapter 450, §76 of the Acts of 1996)

(1.) Every contract awarded pursuant to section forty-four A to L, inclusive, of chapter one hundred and forty-nine shall contain the following subparagraphs (a) through (i) and every contract awarded pursuant to section thirty-nine M of chapter thirty shall contain the following subparagraphs (a) through (h) and in each case those subparagraphs shall be binding between the general contractor and each subcontractor.

(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by the subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(b) Not later than the sixty-fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor, and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of the balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall

not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by a decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account for accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of the such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.

(i) If the subcontractor does not receive payment as provided in subparagraph (a) or if the general contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the subcontractor and the subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (a), the subcontractor may demand direct payment by following the procedure in subparagraph (d) and the general contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the subcontractor performed or furnished the labor and materials for which the subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (e), (f), (g) and (h).

Article 2. METHOD OF PAYING GENERAL CONTRACTORS

(General Laws, Chapter 30, Section 39K as most recently amended by Chapter 145 of the Acts of 1991 and Chapter 151 of the Acts of 1993.)

Every contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building by the commonwealth, or by any county, city, town, district, board, commission or other public body, when the amount is more than five thousand dollars in the case of the commonwealth and more than two thousand dollars in the case of any county, city, town, district, board, commission or other public body, shall contain the following paragraph:--Within fifteen days (forty-five days in the case of the commonwealth, including local housing authorities) after receipt from the contractor, at the place designated by the awarding authority if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the awarding authority will make a periodic payment to the contractor for the work performed during the preceding month and for the materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the contractor has title or to which a subcontractor has title and has authorized the contractor to transfer title to the awarding authority, less (1) a retention based on its estimate of the fair value of its claims against the contractor and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and less (3) a retention not exceeding five per cent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the contractor fully completes the work or substantially completes the work so

that the value of the work remaining to be done is, in the estimate of the awarding authority, less than one per cent of the original contract price, or (b) the contractor substantially completes the work and the awarding authority takes possession for occupancy, whichever occurs first, the awarding authority shall pay the contractor the entire balance due on the contract less (1) a retention based on its estimate of the fair value of its claims against the contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, or based on the record of payments by the contractor to the subcontractors under this contract if such record of payment indicates that the contractor has not paid subcontractors as provided in section thirty-nine F. If the awarding authority fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days (twenty-four days in the case of the commonwealth) after receipt of such a periodic estimate from the contractor, at the place designated by the awarding authority if such a place is so designated. The contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.

The awarding authority may make changes in any periodic estimate submitted by the contractor and the payment due on said periodic estimate shall be computed in accordance with the changes so made, but such changes or any requirement for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided, that the awarding authority may, within seven days after receipt, return to the contractor for correction, any periodic estimate which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt of such periodic estimate shall be the date of receipt of the corrected periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday shall be the first working day thereafter. The provisions of section thirty-nine G shall not apply to any contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building to which this section applies.

All periodic estimates shall be submitted to the awarding authority, or to its designee as set forth in writing to the contractor, and the date of receipt by the awarding authority or its designee shall be marked on the estimate. All periodic estimates shall contain a separate item for each filed subtrade and each sub-subtrade listed in sub-bid form as required by specifications and a column listing the amount paid to each subcontractor and sub-subcontractor as of the date the periodic estimate is filed. The person making payment for the awarding authority shall add the daily interest provided for herein to each payment for each day beyond the due date based on the date of receipt marked on the estimate.

A certificate of the architect to the effect that the contractor has fully or substantially completed the work shall, subject to the provisions of section thirty-nine J, be conclusive for the purposes of this section.

Article 3. CLAIMS FOR UNFORESEEN CONDITIONS

(General Laws, Chapter 30, Section 39N as most recently amended by Chapter 774 of the Acts of 1972)

Every contract subject to section forty-four A of chapter one hundred and forty-nine or subject to section thirty-nine M of chapter thirty shall contain the following paragraph in its entirety and an awarding authority may adopt reasonable rules or regulations in conformity with that paragraph concerning the filing, investigation and settlement of such claims:

If, during the progress of the work, the contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the contract documents either the contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a contractor, or upon its

own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the plans and contract documents and are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly.

Article 4. CLAIMS FOR DELAY

(General Laws, Chapter 30, Section 390 as added by Chapter 116 of the Acts of 1973)

Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing, as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act of failure to act involved in the claim.

Article 5. DECISIONS AND APPROVALS BY ENGINEER OR ARCHITECT

(General Laws, Chapter 30, Section 39P, as added by Chapter 1164 of the Acts of 1973)

Every contract subject to section thirty-nine M of this chapter or section forty-four A of chapter one hundred forty-nine which requires the awarding authority, any official, its architect or engineer to make a decision on interpretation of the specifications, approval of equipment, material or any other approval, or progress of the work, shall require that the decision be made promptly and, in any event, no later than thirty days after the written submission for decision; but if such decision requires extended investigation and study, the awarding authority, the official, architect or engineer shall, within thirty days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty day period and the date by which the decision will be made.

Article 6. PREFERENCE IN EMPLOYMENT, WAGES

(General Laws, Chapter 149 Section 26 as most recently amended by Chapter 665 of the Acts of 1986 and Chapter 552 of the Acts of 1991).

In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works by the commonwealth, or by a county, town or district, or by persons contracting or subcontracting for such works, preference shall first be given to citizens of the commonwealth who have been residents of the commonwealth for at least six months at the commencement of their employment who are male veterans as defined in clause Forty-third of section seven of chapter four, and who are qualified to perform the work to which the employment relates; and secondly, to citizens of the commonwealth generally who have been residents of the commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States, and every contract for such work shall contain a provision to this effect. Each county, town or district in the construction of public works, or persons contracting or subcontracting for such works, shall give preference to veterans and citizens who are residents of such county, town or district. The rate per hour of the wages paid to said mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works shall not be less than the rate or rates of wages to be determined by the commissioner as hereinafter provided; provided, that the wages paid to laborers employed on said works shall not be less than those paid to laborers in the municipal service of the town or towns where said works are being constructed; provided, further, that where the same public work is to be constructed in two or more towns, the wages paid to laborers shall not be less than those paid to laborers in the municipal service of the town paying the highest rate; provided, further, that if, in any of the towns where the works are to be constructed, a wage rate or wage rates have been established in certain trades and occupations by collective agreements or understandings in the private construction industry between organized labor and employers, the rate or rates to be paid on said works shall not be less than the rates so established, provided, further that in towns where no such rate or rates have been so established, the wages paid to mechanics and apprentices, teamster, chauffeurs and laborers on public works, shall not be less than the wages paid to the employees in the same trades and occupations by private employers engaged in the construction industry. This section shall also apply to regular employees of the commonwealth or of a county, town or district, when such employees are employed in the construction, addition to or alteration of public buildings for which special appropriation of more than One Thousand Dollars are provided. Payments by employers to health and welfare plans, pension plans and supplementary unemployment benefit plans under collective bargaining agreements or understandings between organized labor and employers shall be included for the purpose of establishing minimum wage rates as herein provided.

Article 7. HOURS OF WORK

(General Laws, Chapter 149 Section 34 as most recently amended by Chapter 552 of the Acts of 1991).

Every contract, except for the purchase of material or supplies, involving the employment of laborers, workmen, mechanics, foremen or inspectors, to which the commonwealth or any county or town, subject to section thirty, is a party, shall contain a stipulation that no laborer, workman, mechanic, foreman or inspector working within the commonwealth, in the employ of the contractor, subcontractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in case of emergency, or, in case any town subject to section thirty-one is a party to such a contract, more than eight hours in any one day, except as aforesaid, provided, that in contracts entered into by the department of highways for the construction or reconstruction of highways there may be inserted in said stipulation a provision that said department, or any contractor or subcontractor for said department, may employ laborers, workmen, mechanics, foremen and inspectors for more than eight hours in any one day in such construction or reconstruction when, in the opinion of the commissioner of labor and industries, public necessity so requires. Every such contract not containing the aforesaid stipulation shall be null and void.

Article 8. WORK BY FOREIGN CORPORATIONS

(General Laws, Chapter 30 Section 39L, as most recently amended by Chapter 3 of the Acts of 1967).

The Commonwealth and every county, city, town, district, board, commission or other public body which, as the awarding authority, requests proposals, bids or subbids for any work in the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or other public works (1) shall not enter into a contract for such work with, and

shall not approve as a subcontractor furnishing labor and materials for a part of any such work, a foreign corporation which has not filed with such awarding authority a certificate of the state secretary stating that such corporation has complied with sections three and five of chapter one hundred and eighty-one and the date of such compliance, and (2) shall report to the state secretary and to the department of corporations and taxation any foreign corporation performing work under such contract or subcontract, and any person, other than a corporation, performing work under such contract or subcontract, and residing or having a principal place of business outside the Commonwealth.

END OF SUPPLEMENTAL CONDITIONS

BUILDING MAINTENANCE SERVICE CONTRACT

SPECIAL CONDITIONS

The following provisions supplement the General Conditions of the Contract for Non-Technical Services. In the event of conflict or discrepancy between the General Conditions and these Special Conditions, the provisions of the Special Conditions shall govern.

1.0 SUMMARY OF WORK

A. The Work under the Contract consists of:

1. Furnishing all labor, materials, tools, equipment and supervision necessary to accomplish the work described herein, in accordance with all specifications and requirements of the Project Manual.
2. All work either shown on the Drawings (if any) or included in the specifications unless specifically indicated as not to be done.

B. In addition, the work under the Contract includes:

1. Work outside the Project Site as called for in the Contract Documents and as required for the performance of the Work.
2. The restoration of any items damaged or destroyed by encroaching upon areas outside the Project Site.
3. Providing and restoring, where appropriate, all temporary facilities.

C. The Proposed Contract Price shall be complete costs, including overhead, profit, insurance, transportation, and all other costs connected with, or incidental to, the work described.

2.0 PROJECT SITE

A. The areas of work for this contract shall be various buildings within the City of Newton as specified on Work Orders to be issued from time to time during the term of this Contract.

3.0 NOTICE TO PROCEED/FAILURE TO COMMENCE WORK

- A. From time to time during the term of this Contract, the Contractor shall be issued notice to proceed in the form of a written Work Order issued by the Public Building Department listing specific work items to be performed in accordance with this Contract. The Contractor shall commence performance of the work within the time specified in the Work Order, and in no event within less than the time limits stated in the Work Specifications contained in the Project Manual.**
- B. In the event the contractor fails to commence performance within the specified time, and/or notifies the City of its inability to do so, the City shall call upon the second Contractor awarded pursuant to this bid (if any) to perform the required work.**
- C. In the event the second Contractor awarded pursuant to this bid is unable to commence performance within the required time, or if there is no second Contractor, the City reserves the right to contract for the work on the open market at the then prevailing rate and to deduct from any monies due or that may thereafter become due to the contractor the difference between the price stated for the work in the contract and the actual cost thereof to the City.**

- D. In the event of Contractor's repeated failure to commence work within the time required by these specifications, the City shall exercise all provisions contained in the General Conditions regarding default, suspension or termination of this contract.

4.0 PAYMENT

- A. Once each month, on a date established by the City, the Contractor may submit an Application for Payment (Invoice) for the work performed during the preceeding month. The Contractor may invoice for all Work Orders completed and accepted during the preceeding month, and for all Work Orders either partially completed or not yet accepted by the City.
- B. Upon receipt of the Application for Payment, the City will, within fifteen days, make payment in full for all Work Orders completed and accepted during the preceeding month. For Work Orders partially completed or not yet accepted, the City will make payment for the value of the Work Order completed during the preceeding month, less a retainage of 5% of the estimated total of the Work Order. The City will make final payment for partially completed Work Orders, including any retained amounts, upon completion and acceptance of the work and receipt of an Application for Payment at the end of the month in which the work is completed and accepted.

5.0 COMMUNICATIONS

- A. All notices, demands, requests, instructions, approvals and claims must be in writing.
- B. Any such notice shall be deemed to have been given as of the time of delivery, or of actual receipt in the case of telegrams or, in the case of mailing, when it should have been received in due course of post.
- C. For communicating purposes, the office address of the Contractor shall be that stated on the signature page of the contract; that of the City shall be as stated in the Invitation for Bids. Any subsequent change in address of either party shall be communicated to the other in writing.

6.0 PLANS AND SPECIFICATIONS

- A. The City will furnish to the Contractor, without charge, all copies of the specifications reasonably necessary in the performance of the contract work.

7.0 COORDINATION

The Contractor shall:

- A. Supply to the City the name and telephone number of a responsible person who may be contacted during off-hour emergencies during the term of the Contract.
- B. Cooperate at all times with the City and the Project Manager, and ensure the cooperation of his key personnel and that of his subcontractors.

8.0 CONDUCT OF THE WORK

- A. The work must be completed in a continuous uninterrupted operation. The Contractor must use sufficient workforce and adequate equipment to complete all the necessary work requirements within a minimum period of time.

- B. The work shall be conducted between the hours of 8:00 a.m. and 5:00 p.m. on Monday through Friday. No work shall be done on holidays, Saturdays or Sundays except as specifically requested and authorized by the City.
- C. Under no circumstances will the contractor be paid at a premium or overtime rate for any work performed without the express advance authorization of the City.
- D. The Contractor is responsible for the security of partially completed work until the project is finally accepted by the City.

9.0 ALTERATION

- A. The Contractor shall patch, repair and/or replace all existing materials and surfaces remaining exposed after installation of new work which have been affected by alteration or removal of existing work. All patch and repair work shall match existing.

10.0 GENERAL DIRECTIONS

- A. Damage to Persons and Property

Any damage to buildings, roads, public roads, bituminous concrete areas, fences, lawn areas, trees, shrubbery, electric or telephone poles, underground utilities, etc., shall be repaired by the Contractor at his own expense. Damaged property shall be returned to its original condition prior to the damages within a reasonable time period, except all utility outages shall be repaired immediately.

- B. Protection of Persons and Property

The Contractor shall, at all times, leave an unobstructed way along the roadways and walks, and shall maintain barriers and lights for the protection of all persons and property in all locations where he has materials stored or work going on, and during the entire time such work is going on or material is stored.

- C. Shutdown of Services

The Contractor's attention is especially called to the fact that continuous operation of building utilities and services is mandatory. During the period of construction of the new work and/or alterations to the existing work, the progress and sequence of installation shall be carefully planned and approved by the City. If any building is to be left without heat, hot water, city water, electricity, gas, sanitary facilities, or any other services, the Contractor shall provide reasonable written notice to the City before proceeding.

- D. Care of Work

All work is to be carefully protected so that no injury will come to it from water, frost, accident, or any other cause and any injury which may come to any of the work shall be repaired immediately by the Contractor at his own expense and without additional cost to the City. This shall also apply to any abutting or adjoining work on premises. The Contractor shall be responsible for any damage and in the event of such damage, the Contractor shall repair the damage immediately at his own cost and without additional cost to the City.

- E. Removal of Debris

Debris of any nature shall be completely removed from the site at the end of each days work and disposed of in accordance with all Federal, State and local regulations.

- F. The Contractor is responsible for the security of all work until it is accepted by the City.

11.0 TEMPORARY UTILITIES

- A. Prior to execution of the Work, the Contractor shall confer with a representative of the Public Building Department regarding the use of utilities and facilities at the worksite. No City utilities or facilities are to be used by the Contractor in the performance of this Contract without the prior approval of the City.

12.0 SUBMISSION OF PAYROLLS

- A. The Contractor shall, with each invoice submitted during the term of this Contract, submit to the City two (2) legible copies of his payrolls documenting the wages paid to all employees performing on site labor relating to the work of this Contract. These copies shall be prepared on forms supplied by the City.

13.0 DRAWINGS (IF APPLICABLE)

- A. The drawings attached herein and such drawings as may be issued per addendum, shall constitute an integral part of this section and shall serve as the working drawings.
- B. Drawings shall not be scaled. Field verification is directed since actual locations, dimensions and levels are existing.
- C. All items not specifically mentioned in the specifications or noted on the drawings, but which are obviously necessary to make a complete working installation, shall be included.

14.0 MATERIALS

- A. Unless specifically so stated to the contrary the use of a manufacturer's name or style number is not restrictive, and is intended solely as an identification of the type and quality of the materials and services required. In all cases, the words "or approved equal" if not inserted are implied.
- B. An item equal to that named or described in the specifications may upon written approval of the City be furnished by the Contractor. An item shall be considered equal to the item so named or described if (1) it is at least equal in quality, durability, appearance, strength and design; (2) it will perform at least equally the function imposed by the general design for the public work being contracted for or the material being purchased; (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the specifications.
- C. The name and identification of all materials other than the one specifically named shall be submitted to the City in writing for approval, prior to purchase, use or fabrication of such items. Approval shall be at the sole discretion of the City, shall be in writing to be effective, and the decision of the City shall be final. The City may require tests of all materials so submitted to establish quality standards at the Contractor's expense.
- D. For the use of material other than the one specified, the Contractor shall assume the cost of and responsibility for satisfactorily accomplishing all changes that may be required in the work as shown. All directions, specifications and recommendations by manufacturers for the installation, handling, storing, adjustment, and operation of their equipment shall be complied with and responsibility for proper performance shall continue to rest with the Contractor.

- E. The Contractor shall not have any right of appeal from the decision of the City condemning any materials furnished if the Contractor fails to obtain the approval for substitution in accordance with these provisions. If any substitutu in is more costly, the Contracotr shall pay for such costs

15.0 WARRANTY AND INDEMNIFICATION

- A. In addition to other guarantees or warranties required under law or other sections of the specification, the Contractor warrants all materials furnished and labor performed under this Contract to be free from defects or errors in workmanship or installation for a period of one year from the date of Completion of the work, as certified by the Project Manager. The Contractor shall indemnify the Authority for the full cost of any damage to the property that may result by reason of such defects or errors and shall indemnify the Authority from and against any and all claims, demands, losses, costs, expenses, liabilities and damages, including reasonable attorney's fees and expenses, arising out of or on account of this Contract, including but not limited to claims brought against the Authority for alleged infringement of patents based upon any methods of construction or application of materials furnished under the Contract.
- B. The Contractor shall indemnify, hold harmless and defend the City and its departments, officers, employees, servants, and agents from and against all actions, causes of actions, claims, demands, damages, costs, loss of services, expenses and compensation, including attorney's fees and interest arising out of or resulting directly or indirectly from the services rendered pursuant to this Contract, provided that any such action, cause of action, claim, demand, damage, cost, loss of service, expense, compensation (1) in any way grows out of bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, which (2) is caused in whole or in part by any act or omission of the Contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

END OF SECTION

CITY OF NEWTON

MINORITY/ WOMEN BUSINESS ENTERPRISE PLAN

DECEMBER 1, 1999

STATEMENT OF POLICY:

Whereas it is the policy of the government of the United States of America, the Commonwealth of Massachusetts and the City of Newton that no person shall be discriminated against in any manner whatsoever on the grounds of race, religion, color, sex, handicap or national origin; and

Whereas, it is the policy of the government of the United States of America that no person shall, on the grounds of race, color, sex or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program of activity funded entirely or in part by the City, the State or Federal government; and

Whereas, it is the policy of the government of the United States of America to encourage that Minority/Women Business Enterprises shall have the maximum practicable opportunity to participate in Federal and State assisted projects; and all City funded contracts; and

Whereas, it is the policy of the City of Newton to encourage that minority/women business enterprises shall have the maximum practicable opportunity to participate in all City funded contracts; and

Whereas, the City of Newton, as a recipient of Federal and State funds subscribes to the above policies and will fully comply With Federal, State and local laws and directives governing non-discrimination, equal opportunity and affirmative action in all municipal activities; and

Whereas, to further enunciate the equal opportunity policy of the City of Newton's Minority/Women Business Program, the following responsibilities are specified

This MINORITY/ WOMEN Business Enterprise Plan sets forth the administrative standards for the further implementation of the City of Newton's policy of the utilization of minority contractors and subcontractors.

The City of Newton strongly affirms that it will not discriminate in any contractual procedures against any persons because of race, color, religion, age, disability, sex or national origin. This policy shall be administered with a positive supportive attitude.

It is the responsibility of the City of Newton to take affirmative steps to implement this policy to insure equality of opportunity in conducting the Program including notifying those persons and businesses doing business with the City, that contracts for goods, services and construction, shall be made Without reference or regard to race, color, sex, age, handicap, religion or national origin.

David B. Cohen Mayor

CITY OF NEWTON
MINORITY/ WOMEN BUSINESS ENTERPRISE PLAN

DECEMBER 1, 1999

I. DEFINITIONS:

A. Minority Person- the term includes a person who is of Black Hispanic, Asian, American Indian or Cape Verdean origin.

B. Minority Business Enterprise (MBE) -- the term shall mean a business a) that is certified by SOMWBA; or b) 1 provides evidence satisfactory to the City's Affirmative Action Officer that it is a business owned or controlled by one or more of the following:

- an individual who is a minority person,
- a partnership or joint venture controlled by minority persons in which at least 51 % of the ownership interest is held by minority persons or,
- a corporation or other entity controlled by minority persons and in which at least 51 % of the stock is owned by one or more minority persons.

C. Contract Compliance Officer - the Chief Procurement Officer or his/her designee responsible for the implementation of Newton's Minority/Women Enterprise Plan ("MWBE Plan") and activities.

D. MCAD - Massachusetts Commission Against Discrimination.

E. SOMWBA -- State Office of Minority/Women Business Assistance,

F. City - The City of Newton.

G. Women Business Enterprise (WBE) - the term shall mean a business a) that is certified by SOMWBA; or b) provides evidence satisfactory to the City's Affirmative Action Officer that it is a business owned or controlled by one or more of the following:

- an individual who is a woman.
- a partnership or joint venture controlled by women in which at least 51% of the ownership interest is held by women, or
- a corporation or other entity controlled by women and in which at least 51% of the stock is owned by one or more women.

H. MWBE – Minority or Women Business Enterprise

II. GOALS:

Newton's Minority/Women Enterprise Plan ("MWBE Plan") shall be guided by the goals presented below to promote minority/women opportunities within the City.

These goals comprise the framework for those activities to be implemented as part of the MWBE Plan:

To take affirmative action in expanding opportunities for minority and women owned firms in obtaining contracts within the City of Newton.

To assure that all contractors, regardless of race color, religion, creed, national origin, sex, age, ancestry or handicap, shall have equal opportunity to City contracting activities.

To award, of the total annual City contract dollars expended, 10 percent to MBE and 5 percent to WBE for construction; for goods and services, 5 percent WBE and 5 percent MBE.

III. SOLICITATION ACTIVITIES:

To notify MWBEs of upcoming contracts for construction, professional services and supplies, funded in whole or in part with Federal, State, and City funds, the following activities will be undertaken. In addition on a regular basis, the City of Newton will distribute to its listing of MWBEs and SOMWBA, a summary of upcoming contract opportunities which are subject to the City's MWBE Plan.

A. Construction Contracts

All construction contracts with an estimated value over \$50,000 will be formally advertised within local, regional, minority and special interest publications at least 14 days prior to the bid opening date.

For all such construction contracts a "Notice of Solicitation" of a project going out to bid will be distributed to appropriate SOMWBA or City certified firms at least 14 days prior to the bid opening date.

B. Contracts for Professional Services

The City of Newton will send notification of its advertised Request for Proposals to appropriate! SOMWBA or City certified firms Responding MWBE firms will be considered for contract award within the bounds of generally accepted management practice or with the applicable procurement law relating to securing the lowest cost and best services available.

C. Procurement of Supplies

The City of Newton will (where feasible) utilize MWBEs for the procurement of supplies in accordance with City purchasing procedures. These efforts will be documented and reported to MCAD, and the Mayor's office on a quarterly basis.

IV. CONSTRUCTION ACTIVITIES:

A. Goals

The City of Newton bid documents and contracts with an estimated value over \$50,000 will contain the City's goal of 10% for MBE and 5% for WBE utilization for subcontracts,

B. Pre-Bid Conference

To affirmatively further the opportunities available to prospective bidders, the City will hold a pre-bid conference 5-7 days prior to the bid opening date for all City construction contracts and subcontracts with an estimated value over \$50,000.

The pre-bid conference will provide an opportunity for contractors to: review and clarify the technical requirements of the projects, review the City's MWBE Plan; and review Equal Opportunity requirements. The City will advertise this conference and extend invitations to interested contractors as part of the notice of solicitation.

C. Bid Submission

All bids for City of Newton contracts with an estimated value over \$50,000 shall include a certification of intent to be completed by the bidder stating his/her intent to comply with the City's MWBE Plan. Failure to include this certification shall be an informality which may be waived if such certification is received prior to the award of the contract.

D. Contract Execution

Upon notification of award of the contract, the bidder shall provide a written plan detailing how it will comply with the MWBE Plan.

E. Monitoring

Throughout the duration of the contract, the City of Newton through its Contract Compliance Officer, will monitor the progress and activities of all contractors and subcontractors as they attempt to comply with the MWBE Plan.

F. Enforcement

In the case of clear neglect to make a good faith effort to comply with this MWBE Plan, the City of Newton reserves the right to designate contractor, after a hearing, as ineligible for future City bid awards.

V. CONTRACT COMPLIANCE OFFICER/DUTIES AND RESPONSIBILITIES:

The Contract Compliance Officer, as liaison between minority firms and the City of Newton will have the overall responsibility for the implementation of Newton's MWBE Plan. This responsibility includes the development, management, dissemination of information; the provision of technical assistance to minority firms including clarification of procedures to be implemented; maintenance of relevant documentation; completion of reporting requirements; and performance of monitoring and evaluation activities; and maintenance and updating of listings of minority/women business.

The Contract Compliance Officer has oversight of all City procurements for construction, professional services and supplies and shall coordinate the implementation of the MWBE Plan with other City departments.

THE CITY OF NEWTON, MASSACHUSETTS
SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY
ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

- I. The requirements hereinafter set forth apply to construction contracts which involve an expenditure by the City of \$50,000 or more.
- II. For purposes of this contract "minority" refers to Asian Americans, Black, Hispanics American Indians and Cape Verdeans. The City refers to the City of Newton
- III. During the performance of this contract the Contractor and all of (his) Subcontractors (hereinafter collectively referred to as the Contractor) , for himself, his assignees, and successors ,in interest, agree as follows:
 1. In connection with the performance of work under this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and the selection of apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the City setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (MGL Chapter 151B) . (See Attachment A)
 2. In connection with the performance of work under this contract, the Contractor shall undertake in good faith, affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age or sex, and to eliminate and remedy any effects of such discrimination -in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal employment: opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, 'Layoff or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age or sex. A 'purpose of- this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future City public construction projects
- IV.
 1. As part of this obligation of remedial action under the foregoing section, the contractor shall maintain on this project a not less than 5 percent ratio of minority employee man hours to total man hours in each job category, including, but not limited to, bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work" enumerated in Section 44C of Chapter 149 of the Massachusetts General Laws.
 2. In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals, from the Contractor's affirmative action program approved by the City, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee or the City.
- V.
 1. At the discretion of the City, there may be established for the life of this contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of the Compliance Officer and one representative each from the Departments administering this project, hereinafter called the administering Departments, and such other representatives as may be designated by the City.
 2. The Contractor (or, his/her agent, if any, designated by him/her as the onsite equal employment opportunity officer) shall recognize the Liaison Committee as the affirmative action body, and shall establish a continuing working relationship with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

3. The Contractor shall prepare manning tables on a quarterly basis.* These shall be broken down into projections, by week, for workers required in each trade. Copies shall be furnished one week in advance of the initiation of work and quarterly thereafter to the City and to the Liaison Committee.
4. Records of employment referral orders, prepared by the Contractor, shall be made available to the City and to the Liaison Committee on request.
5. The contractor shall prepare weekly reports in a form approved by the City of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these reports shall be provided at the end of each week to the City and to the Liaison Committee.

* If job is less than three months, prepare for length of job.

- VI. If the Contractor shall use any sub contractor on any work performed under this contract, he/she shall take affirmative action to negotiate with qualified minority subcontractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the State Office of: *Minority Business Assistance* or As designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.
- VII. In the employment of journeyman, apprentices, trainees, and advanced trainees, the Contractor shall give preference to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to perform the work to which the employment relates, and, secondly to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States
- VIII. A designee of the City and a designee of the Liaison Committee shall each have the right of access to the Construction site,
- IX. **Compliance with Requirements**
The Contractor shall comply with the provisions of Chapter 151B of the Massachusetts General Laws, which are herein incorporated by reference and made as amended by Executive Order 227, and of Chapter 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this contract.
- X. **Non-Discrimination**
The Contractor, in the performance of all work after award, and prior to completion of the contract work, will not discriminate on the grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of sub-contractors, or in the procurement of materials and rentals of equipment.
- XI. **Solicitations for sub-Contracts and for the Procurement of Materials and Equipment**
In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under his contract relative to non-discrimination and affirmative action.
- XII. **Bidders Certification Requirement**
 1. The following certification statement will be inserted in the bid document just above the bidder's signature.

"The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained in the City of Newton, Massachusetts Supplemental Equal Employment-- Opportunity Anti-Discrimination and Affirmative Action Program. The Contractor receiving the award of the contract

shall be required to obtain from each of its subcontractors and submit to the contracting or, administering agency prior to the performance of any work under said contract a certification by said subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the City of Newton Massachusetts Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program.

XIII. Contractor's Certification

A Contractor's certification form must be signed by all successful low bidders prior to award by the City. A Contractor shall not be eligible for award of a contract unless the contractor has executed and submitted the Contractor's Certification, which shall be deemed a part of the resulting contract. (See Attachment B)

XIV. Subcontractor's Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor a subcontractor's certification setting forth the subcontractor's compliance with this program, which shall be deemed a part of the resulting subcontract. (See Attachment C)

XV. Compliance - Information, Reports and Sanctions

1. The Contractor will provide all information and reports Required by the administering department or, the City on instruction issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the City to affect the employment of personnel. This provision shall apply only to information pertinent to the City's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering department or the City as appropriate and shall set forth what efforts he/she has made to obtain the information.
2. Whenever the administering department, the City, or the Liaison Committee believes the General Contractor or any Subcontractor may not-, be operating in compliance with the terms of this Section, the City directly, or through its designated agent, shall conduct: an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Section. If the City or its agent finds the General Contractor or any Subcontractor not in compliance, it shall make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgement of the City or its agent bring such Contractor into compliance. In the event, that such Contractor fails or refuses to fully perform such steps, the City shall make a final report of non-compliance, and recommend to the administering department the imposition of one or more of the sanctions listed below. If, however, the City believes the General Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. within fourteen days at the receipt of the recommendations of the City, the administering department shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:
 - (a) The recovery by the administering department from the General Contractor of 1/100 of 11 of the contract award price or \$1000 whichever sum is greater, in the nature of liquidated damages or if a Subcontractor is in non-compliance, the recovery by the administering department from the General Contractor, to be assessed by the General Contractor as a back charge against the Subcontractor, of 1/10 of 1% of the sub-contract price, or \$400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply
 - (b) The suspension of any payment of part thereof due under the contract until such time as the General Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract;
 - (c) The termination, or cancellation, of the contract, in whole or in part, unless the General Contractor or any Subcontractor is able to demonstrate within a specified time his/her compliance with the terms of the City's affirmative action construction contract requirements; OR,

(d) The denial to the General Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering department for a period of up to three years.

3. If at any time after the imposition of one or more of the above sanctions (unless the contract has been terminated), a Contractor is able to demonstrate that he/she is in compliance with this section, he/she may request the City to suspend the sanctions conditionally pending a final determination by the City as to whether the Contractor is in compliance. Upon final determination of the City, the administering department, based upon the recommendation of the City, shall either lift the sanctions or continue them.
4. Sanctions enumerated under Section XV shall not be imposed by the City except after the General Contractor or Subcontractor have had an opportunity for full and fair hearing with City. The non-compliance investigation shall be initiated without prior notice to the contractor. Any sanctions to be imposed shall be set forth fully and completely in writing, and may then be appealed to the City in writing by the Contractor.

.XIV. Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

FAIR EMPLOYMENT LAW

The Fair Employment Law declares that it is illegal to discriminate on the basis of race, color, religious creed, national origin, sex, sexual orientation, age, ancestry or disability

IT IS UNLAWFUL:

- to print or circulate any advertisement or use any application form which directly or indirectly specifies any limitation on the basis of race, color, religious creed, national origin, sex, sexual orientation, age, ancestry or disability.
- to discharge or refuse to hire any individual on the basis of their race, color, religious creed, national origin, sex, sexual orientation, age, ancestry, or disability.
- to discriminate against any individual in matters relating to compensation, terms, conditions, or privileges of employment because of their race, color, religious creed, national origin, sex, sexual orientation, age, ancestry or disability.
- to require a woman to leave her job at some arbitrary stage in her pregnancy or to refuse to let her return to work until a specified time set by the employer.
- to grant a female employee at least eight weeks leave for purposes of childbirth or to treat her absence differently than any other absence due to disability.
- to require an employee to remain at work during any day or part thereof that s/he observes as a religious holiday provided that the employee gives a ten-day notice and the absence does not cause undue hardship to the employer.
- to discharge or refuse to hire any person because of their failure to furnish information concerning admission to a center for the treatment of mentally ill persons.
- to discriminate against a job applicant for failure to furnish information, written or oral, concerning- A) an arrest, detention or disposition regarding a violation of law in which no conviction resulted; B) a first conviction for any of the following misdemeanors: driving under the influence, simple assault, speeding, minor traffic violations, disturbance of the peace; or C) conviction for a misdemeanor where the date of the conviction or end of period of incarceration, if any, occurred more than five years prior to the employment application, and the applicant has not been convicted of any offense within the five years immediately before the date of application.

RETALIATION

It is illegal to retaliate against any person because s/he has opposed any practices forbidden under this Chapter or because s/he has filed a complaint, testified, or assisted in any proceeding before the Commission. It is also illegal to aid, abet, incite, compel or coerce the doings of any of the acts forbidden under this Chapter or to attempt to do so.

SEXUAL HARASSMENT

151B:1,18 The term "sexual harassment" shall mean sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when (a) submission to or rejection of such advances, requests or conduct is made either explicitly or implicitly a term or condition of employment, or as a basis for employment decisions; (h) such advances, requests or conduct have the purpose or effect of unreasonably interfering with an individual's work performance by creating an intimidating, hostile, humiliating or sexually offensive work environment.

COMPLAINTS

All complaints must be filed in writing. Information on the filing of complaints can be obtained by contacting the MASSACHUSETTS COMMISSION AGAINST DISCRIMINATION at the following locations:

Boston office:
One Ashburton Place
Room 601
Boston, MA 02108
(617) 727-3990

Springfield office:
436 Dwight Street
Suite 315
Springfield, MA 01103
(413) 739-2145

Attachment B

CITY OF NEWTON

Contractors Certification

A Contractor will not be eligible for award of a contract, unless such contractor has submitted the following certification, which is deemed a part of the resulting contract.

CONTRACTOR'S CERTIFICATION

Contractor's Name

Certifies that:

it tends to use the following listed construction trades in the work under the contract

_____ and

2. will comply with the minority manpower ration and specific affirmative action steps contained herein; and
3. will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions

(Signature of authorized representative of Contractor)

Any contract for the provision of goods or services to the City of Newton or any of its departments is subject to the ordinance creating the Human Rights Commission, as it may be amended from Time to Time. Any complaints within the purview shall be forwarded immediately to the contracting agency, and a copy shall be sent to the Human Rights Commission; any complaints received by the contracting agency shall be forwarded to the contractor, and a copy shall be sent to the Human Rights Commission.

Attachment C

CITY OF NEWTON

Subcontractors Certification

Prior to the award of any subcontract , regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting subcontractor.

SUBCONTRACTOR`S CERTIFICATION

_____. Certifies that:
Contractor's Name

it tends to use the following listed construction trades in the work under the contract

_____ and

will comply with the minority manpower ration and specific affirmative action steps contained herein; and

will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions

Pursuant to M.G.L. Ch. 62C, Sec. 49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

(Signature of authorized representative of Contractor)

In order to ensure that the said subcontractor's certification becomes part of all subcontracts under the prime contract, no subcontract shall be executed until an authorizee representative of the Administrative Agency administering this project has determined in writing, that the said certification has been incorporated in such subcontract, regardless of tier, Any subcontract executed without such written approval shall be void.

Any contract for the provision of goods or services to the City of Newton or any of its departments is subject to the ordinance creating the Human Rights Commission, as it may be amended from Time to Time. Any complaints within the purview shall be forwarded immediately to the contracting agency, and a copy shall be sent to the Human Rights Commission; any complaints received by the contracting agency shall be forwarded to the contractor, and a copy shall be sent to the Human Rights Commission.

END OF SECTION

CITY OF NEWTON

WAGE RATE REQUIREMENTS

1. GENERAL

- A.** This section summarizes the requirements for the payment of wages to laborers and mechanics employed under the Contract.
- B.** Other duties and requirements of law which may not be specified in this section apply and are inherently a part of the Contract.

2. WAGE RATES

- A.** The rate per hour to be paid to mechanics, apprentices, teamsters, chauffeurs, and laborers employed on the Work shall not be less than the rate of wages in the attached "Minimum Wage Rates" as determined by the Commissioner of Labor and Industries. This schedule shall continue to be the minimum rate of wages for said employees during the life of this Contract.
- B.** Keep posted on the site a legible copy of said schedule. Keep on file the wage rates and classifications of labor employed on this Work in order that they may be available for inspection by the Owner, Administrator, or the Architect.
- C.** Apprentices employed pursuant to this determination of wage rates must be registered and approved by the State Apprenticeship Council wherever rates for journeymen or apprentices are not listed.
- D.** Pay reserve police officers employed on the Work the prevailing rate of wages paid to regular police officers as required by M.G.L. c149, Sec. 34B, as amended. Such police officers shall be covered by Workmen's Compensation Insurance and Employers Liability Insurance by the Contractor.
- E.** The Contractor and all subcontractors shall, on a weekly basis throughout the term of the contract, provide to the City of Newton certified payroll affidavits verifying compliance with M.G.L. c.149, Sec. 27, 27A and 27B.
- F.** The Contractor and all subcontractors shall provide a Statement of Compliance within 15 days of the completion of its portion of the work. This statement shall be submitted to the Owner on the form found elsewhere in this section.
- G.** The Contractor shall maintain accurate and complete records, including payroll records, during the Contract term and for three years thereafter.

END OF SECTION

The Massachusetts Prevailing Wage Law

M.G.L. ch. 149, §§ 26 – 27

NOTICE TO AWARDING AUTHORITIES

- ‘The enclosed wage schedule applies only to the specific project listed at the top and will remain in effect for the duration of the project.
- ‘You should request an updated wage schedule from the Division of Occupational Safety if you have not opened bids or selected a contractor within 90 days of the date of issuance of the enclosed wage schedule.
- ‘The wage schedule shall be incorporated in any advertisement or call for bids for the project for which it has been issued.
- ‘Once a contractor has been selected by the awarding authority, the wage schedule shall be made a part of the contract for that project.

NOTICE TO CONTRACTORS

- The enclosed wage schedule must be posted in a conspicuous place at the work site during the life of the project.
- The wages listed on the enclosed wage schedule must be paid to employees on public works projects regardless of whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- The enclosed wage schedule applies to all phases of the project including the final clean-up. Contractors whose only role is to perform final clean-up must pay their employees according to this wage schedule.
- All apprentices must be registered with the Massachusetts Division of Apprentice Training in order to be paid at the reduced apprentice rates. If a worker is not registered with the Division of Apprentice Training, they must be paid the “total rate” listed on the wage schedule regardless of experience or skill level. For further information, please call (617) 727-3486 or write to the Division of Apprentice Training, 399 Washington Street, 4th Floor, Boston, MA 02108



DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification	Effective Dates and Total Rates														
Construction															
(2 AXLE) DRIVER EQUIPMENT	12/01/2008	\$42.260													
(3 AXLE) DRIVER EQUIPMENT	12/01/2008	\$42.330													
(4 & 5 AXLE) DRIVER EQUIPMENT	12/01/2008	\$42.430													
ADS/SUBMERSIBLE PILOT	08/01/2009	\$102.480	08/01/2010	\$107.460	08/01/2011	\$112.980									
AIR TRACK OPERATOR	06/01/2009	\$46.830	12/01/2009	\$47.830	06/01/2010	\$48.830									
	12/01/2010	\$50.100	06/01/2011	\$51.100	12/01/2011	\$52.330									
ASBESTOS REMOVER PIPE / MECH. EQUIPT.	06/01/2009	\$39.230	12/01/2009	\$40.230											
ASPHALT RAKER	06/01/2009	\$46.330	12/01/2009	\$47.330	06/01/2010	\$48.330									
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.830									
ASPHALT/CONCRETE/CRUSHER PLANT ON SITE	06/01/2009	\$57.410	12/01/2009	\$58.330	06/01/2010	\$59.780									
	12/01/2010	\$61.030													
BACKHOE/FRONT END LOADER	06/01/2009	\$57.410	12/01/2009	\$58.330	06/01/2010	\$59.780									
	12/01/2010	\$61.030													
BARCO TYPE JUMPING TAMPER	06/01/2009	\$46.330	12/01/2009	\$47.330	06/01/2010	\$48.330									
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.830									
BLOCK PAVR, RAMMER / CURB SETTER	06/01/2009	\$46.830	12/01/2009	\$47.830	06/01/2010	\$48.830									
	12/01/2010	\$50.100	06/01/2011	\$51.100	12/01/2011	\$52.330									
BOILER MAKER	10/01/2008	\$54.800													
APPRENTICE: BOILERMAKER Local 19															
Ratio	Step	1	2	3	4	5	6	7	8						
1:5	%	65.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00						
BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	08/01/2009	\$67.120	02/01/2010	\$68.010	08/01/2010	\$69.910									
	02/01/2011	\$70.900	08/01/2011	\$73.000	02/01/2012	\$75.990									
APPRENTICE: BRICK/PLASTER/CEMENT/MASON Local 3 Newton															
Ratio	Step	1	2	3	4	5									
1:5	%	50.00	60.00	70.00	80.00	90.00									
BULLDOZER/GRADER/SCRAPER	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430									
	12/01/2010	\$60.680													
CAISSON & UNDERPINNING BOTTOM MAN	06/01/2009	\$47.230	12/01/2009	\$48.230	06/01/2010	\$49.230									
	12/01/2010	\$50.500	06/01/2011	\$51.500	12/01/2011	\$52.750									
CAISSON & UNDERPINNING LABORER	06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100									
	12/01/2010	\$49.330	06/01/2011	\$50.330	12/01/2011	\$51.600									
CAISSON & UNDERPINNING TOP MAN	06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100									
	12/01/2010	\$49.330	06/01/2011	\$50.330	12/01/2011	\$51.600									
CARBIDE CORE DRILL OPERATOR	06/01/2009	\$46.330	12/01/2009	\$47.330	06/01/2010	\$48.330									
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.830									
CARPENTER	03/01/2009	\$52.770													

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27

Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.



DEVAL L. PATRICK
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TIMOTHY P. MURRAY
Lieutenant Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification

Effective Dates and Total Rates

APPRENTICE: CARPENTER Zone 2 Eastern MA											
Ratio	Step	1	2	3	4	5	6	7	8		
1:5	%	50.00	60.00	70.00	75.00	80.00	80.00	90.00	90.00		
CEMENT MASONRY/PLASTERING					08/01/2009	\$65.510	02/01/2010	\$66.200	08/01/2010	\$67.670	
					02/01/2011	\$68.440	08/01/2011	\$70.060	02/01/2012	\$70.830	
CHAIN SAW OPERATOR					06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010	\$48.350	
					12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.600	
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES					06/01/2009	\$57.410	12/01/2009	\$58.530	06/01/2010	\$59.780	
					12/01/2010	\$61.030					
COMPRESSOR OPERATOR					06/01/2009	\$47.070	12/01/2009	\$47.890	06/01/2010	\$48.810	
					12/01/2010	\$49.740					
DELEADER (BRIDGE)					07/01/2009	\$62.260	01/01/2010	\$63.410			
DEMO: ADZEMAN					06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100	
					12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600	
DEMO: BACKHOB/LOADER/HAMMER OPERATOR					06/01/2009	\$47.100	12/01/2009	\$48.100	06/01/2010	\$49.100	
					12/01/2010	\$50.350	06/01/2011	\$51.350	12/01/2011	\$52.600	
DEMO: BURNERS					06/01/2009	\$46.850	12/01/2009	\$47.850	06/01/2010	\$48.850	
					12/01/2010	\$50.100	06/01/2011	\$51.100	12/01/2011	\$52.350	
DEMO: CONCRETE CUTTER/SAWYER					06/01/2009	\$47.100	12/01/2009	\$48.100	06/01/2010	\$49.100	
					12/01/2010	\$50.350	06/01/2011	\$51.350	12/01/2011	\$52.600	
DEMO: JACKHAMMER OPERATOR					06/01/2009	\$46.850	12/01/2009	\$47.850	06/01/2010	\$48.850	
					12/01/2010	\$50.100	06/01/2011	\$51.100	12/01/2011	\$52.350	
DEMO: WRECKING LABORER					06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100	
					12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600	
DIRECTIONAL DRILL MACHINE OPERATOR					06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430	
					12/01/2010	\$60.680					
DIVER					08/01/2009	\$75.600	08/01/2010	\$78.890	08/01/2011	\$82.740	
DIVER TENDER					08/01/2009	\$60.240	08/01/2010	\$62.590	08/01/2011	\$65.340	
DIVER TENDER (EFFLUENT)					08/01/2009	\$79.440	08/01/2010	\$82.960	08/01/2011	\$87.090	
DIVERS/LURRY (EFFLUENT)					08/01/2009	\$102.480	08/01/2010	\$107.410	08/01/2011	\$113.190	
ELECTRICIAN					03/01/2009	\$63.550	09/01/2009	\$64.780	03/01/2010	\$66.020	
					09/01/2010	\$67.260	05/01/2011	\$68.490			
APPRENTICE: ELECTRICIAN Local 103											
Ratio	Step	1	2	3	4	5	6	7	8	9	10
2:3***	%	40.00	40.00	45.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00
App Prior 1/1/03; 3/01/54/04/5/50/55/65/70/75/80											
ELEVATOR CONSTRUCTOR					01/01/2009	\$63.690	01/01/2010	\$65.190	01/01/2011	\$66.690	
					01/01/2012	\$68.190					

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27

Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.



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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification

Effective Dates and Total Rates

APPRENTICE: ELEVATOR CONSTRUCTOR Local 4

Ratio	Step	1	2	3	4	5
1:1	%	\$0.00	\$5.00	\$5.00	\$0.00	\$0.00

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

ELEVATOR CONSTRUCTOR HELPER	01/01/2009	\$49.830	01/01/2010	\$51.330	01/01/2011	\$52.830
	01/01/2012	\$54.330				
FENCE & GUARD RAIL ERECTOR	06/01/2009	\$46.330	12/01/2009	\$47.330	06/01/2010	\$48.330
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.830
FIELD ENG. INST. PERSON (BLDG, SITE, HVY CONST)	05/01/2009	\$54.780	11/01/2009	\$55.890	05/01/2010	\$56.990
	11/01/2010	\$58.230	05/01/2011	\$59.470		
FIELD ENG. ROD PERSON (BLDG, SITE, HVY CONST)	05/01/2009	\$40.260	11/01/2009	\$40.910	05/01/2010	\$41.560
	11/01/2010	\$42.290	05/01/2011	\$43.020		
FIELD ENG. CHIEF OF PARTY (BLDG, SITE, HVY CONST)	05/01/2009	\$56.140	11/01/2009	\$57.250	05/01/2010	\$58.360
	11/01/2010	\$59.610	05/01/2011	\$60.860		
FIRE ALARM INSTALLER	03/01/2009	\$63.530	09/01/2009	\$64.780	03/01/2010	\$66.020
	09/01/2010	\$67.260	03/01/2011	\$68.490		
FIRE ALARM REPAIR / MAINTENANCE	03/01/2009	\$51.620	09/01/2009	\$52.540	03/01/2010	\$53.470
	09/01/2010	\$54.410	03/01/2011	\$55.330		
FIREMAN (ASST. ENGINEER)	06/01/2009	\$51.780	12/01/2009	\$52.740	06/01/2010	\$53.810
	12/01/2010	\$54.890				
FLAGGER & SIGNALER	06/01/2009	\$35.800	12/01/2009	\$35.800	06/01/2010	\$36.800
	12/01/2010	\$36.800	06/01/2011	\$37.800	12/01/2011	\$37.800
FLOORCOVERER	03/01/2009	\$58.380				

APPRENTICE: FLOORCOVERER Local 2168 Zone I

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	\$0.00	\$5.00	\$0.00	\$5.00	\$0.00	\$5.00	\$0.00	\$5.00

Steps are 750 hrs.

FORK LIFT/CHERRY PICKER	06/01/2009	\$57.410	12/01/2009	\$58.530	06/01/2010	\$59.780
	12/01/2010	\$61.030				
GENERATOR/LIGHTING PLANT/HEATERS	06/01/2009	\$47.070	12/01/2009	\$47.890	06/01/2010	\$48.810
	12/01/2010	\$49.740				
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)	07/01/2009	\$51.760	01/01/2010	\$52.910		

APPRENTICE: GLAZIER Local 35 Zone 2

Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	\$0.00	\$5.00	\$0.00	\$5.00	\$0.00	\$5.00	\$0.00	\$5.00

Steps are 750 hrs.

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27

Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.



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Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification				Effective Dates and Total Rates					
HOISTING ENGINEER/CRANES/GRADALLS				06/01/2009	\$57.410	12/01/2009	\$58.530	06/01/2010	\$59.780
				12/01/2010	\$61.030				
APPRENTICE: HOIST/PORT. ENG. Local 4									
Ratio	Step	1	2	3	4	5	6	7	8
1:6	%	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00
HVAC(DUCTWORK)				08/01/2009	\$62.260	02/01/2010	\$63.510	08/01/2010	\$64.760
				02/01/2011	\$66.010	08/01/2011	\$67.260	02/01/2012	\$68.510
				08/01/2012	\$69.760	02/01/2013	\$71.010		
HVAC(ELECTRICAL CONTROLS)				03/01/2009	\$63.530	09/01/2009	\$64.780	03/01/2010	\$66.020
				09/01/2010	\$67.260	05/01/2011	\$68.490		
HVAC(TESTING AND BALANCING AIR)				08/01/2009	\$62.260	02/01/2010	\$63.510	08/01/2010	\$64.760
				02/01/2011	\$66.010	08/01/2011	\$67.260	02/01/2012	\$68.510
				08/01/2012	\$69.760	02/01/2013	\$71.010		
HVAC(TESTING AND BALANCING WATER)				03/01/2009	\$65.980	09/01/2009	\$67.480	03/01/2010	\$68.730
HVACMECHANIC				03/01/2009	\$65.980	09/01/2009	\$67.480	03/01/2010	\$68.730
HYDRAULIC DRILLS				06/01/2009	\$46.850	12/01/2009	\$47.850	06/01/2010	\$48.850
				12/01/2010	\$50.100	06/01/2011	\$51.100	12/01/2011	\$52.350
INSULATOR (PIPES & TANKS)				09/01/2008	\$56.860	09/01/2009	\$59.260	09/01/2010	\$61.660
APPRENTICE: ASBESTOS INSULATOR (Pipes & Tanks) Local 6 Boston									
Ratio	Step	1	2	3	4				
1:4	%	50.00	60.00	70.00	80.00				
Steps are 1 year									
IRONWORKER/WELDER				03/16/2009	\$58.230	09/16/2009	\$59.580	03/16/2010	\$60.980
APPRENTICE: IRONWORKER Local 7									
Ratio	Step	1	2	3	4	5	6		
	%	60.00	70.00	75.00	80.00	85.00	90.00		
Structural 1:6; Ornamental 1:4									
JACKHAMMER & PAVING BREAKER OPERATOR				06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010	\$48.350
				12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.850
LABORER				06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100
				12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600
APPRENTICE: LABORER Zone 1									
Ratio	Step	1	2	3	4				
1:5	%	60.00	70.00	80.00	90.00				
LABORER: CARPENTER TENDER				06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100
				12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27

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DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification	Effective Dates and Total Rates								
LABORER: CEMENT FINISHER TENDER	06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100			
	12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600			
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER	06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100			
	12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600			
LABORER: MASON TENDER	06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010	\$48.350			
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.850			
LABORER: MULTI TRADE TENDER	06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100			
	12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600			
LABORER: TREE REMOVER	06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100			
	12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600			
This classification applies to the wholesale removal of standing trees including all associated trimming of branches and limbs, and applies to the removal of branches at locations not on or around utility lines.									
LASER BEAM OPERATOR	06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010	\$48.350			
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.850			
MARBLE & TILE FINISHERS	08/01/2009	\$56.240	02/01/2010	\$56.950	08/01/2010	\$58.470			
	02/01/2011	\$59.270	08/01/2011	\$60.950	02/01/2012	\$61.740			
APPRENTICE: MARBLE TILE TERRAZZO FINISHER Local 3 Marble & Tile									
Ratio	Step	1	2	3	4	5			
1:3	%	50.00	60.00	70.00	80.00	90.00			
Steps are 800 hrs.									
MARBLE MASONS, TILELAYERS & TERRAZZO MECH	08/01/2009	\$67.160	02/01/2010	\$68.050	08/01/2010	\$69.950			
	02/01/2011	\$70.940	08/01/2011	\$75.040	02/01/2012	\$74.030			
APPRENTICE: MARBLE TILE TERRAZZO MECHANIC Local 3 Marble & Tile									
Ratio	Step	1	2	3	4	5			
1:3	%	50.00	60.00	70.00	80.00	90.00			
MECH SWEEPER OPERATOR (NON CONSTRUCTION)	07/01/2009	\$28.300	07/01/2010	\$29.000	07/01/2011	\$29.700			
MECH SWEEPER OPERATOR (ON CONST. SITES)	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430			
	12/01/2010	\$60.680							
MECHANICS MAINTENANCE	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430			
	12/01/2010	\$60.680							
MILLWRIGHT (Zone 1)	03/01/2009	\$54.400							
APPRENTICE: MILLWRIGHT Local 1121 Zone 1									
Ratio	Step	1	2	3	4	5	6	7	8
1:5	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00
MORTAR MIXER	06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010	\$48.350			
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.850			
OILER (OTHER THAN TRUCK CRANES, GRADALLS)	06/01/2009	\$41.090	12/01/2009	\$41.750	06/01/2010	\$42.480			
	12/01/2010	\$43.220							

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27

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DEVAL L. PATRICK
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TIMOTHY P. MURRAY
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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification		Effective Dates and Total Rates							
OILER (TRUCK CRANES, GRADALLS)		06/01/2009	\$43.990	12/01/2009	\$44.720	06/01/2010	\$45.530		
		12/01/2010	\$46.380						
OTHER POWER DRIVEN EQUIPMENT CLASS II		06/01/2009	\$37.090	12/01/2009	\$38.190	06/01/2010	\$39.430		
		12/01/2010	\$40.680						
PAINTER (BRIDGES/TANKS)		07/01/2009	\$62.260	01/01/2010	\$63.410				
APPRENTICE: PAINTER Local 35 Zone 2									
Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00
Steps are 750 hrs.									
PAINTER (SPRAY OR SANDBLAST, NEW) *		07/01/2009	\$53.160	01/01/2010	\$54.310				
* If 50% or more of surfaces to be painted are new construction, NEW paint rate shall be used.									
APPRENTICE: PAINTER Local 35 Zone 2									
Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00
Steps are 750 hrs.									
PAINTER (SPRAY OR SANDBLAST, REPAINT)		07/01/2009	\$51.220	01/01/2010	\$52.370				
APPRENTICE: PAINTER Local 35 Zone 2									
Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00
Steps are 750 hrs.									
PAINTER (TRAFFIC MARKINGS)		06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100		
		12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600		
PAINTER / TAPER (BRUSH, NEW) *		07/01/2009	\$51.760	01/01/2010	\$52.910				
* If 50% or more of surfaces to be painted are new construction, NEW paint rate shall be used.									
APPRENTICE: PAINTER Local 35 Zone 2									
Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00
Steps are 750 hrs.									
PAINTER / TAPER (BRUSH, REPAINT)		07/01/2009	\$49.820	01/01/2010	\$50.970				
APPRENTICE: PAINTER Local 35 Zone 2									
Ratio	Step	1	2	3	4	5	6	7	8
1:1	%	50.00	55.00	60.00	65.00	70.00	75.00	80.00	90.00
Steps are 750 hrs.									

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Issue Date: 08/10/2009

Wage Request Number: 20090810-022

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DEVAL L. PATRICK
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THE COMMONWEALTH OF MASSACHUSETTS
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DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
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GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification	Effective Dates and Total Rates				
PANEL & PICKUP TRUCKS DRIVER	12/01/2008	\$42.090			
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2009	\$60.240	08/01/2010	\$62.590	08/01/2011 \$65.340
PILE DRIVER	08/01/2009	\$60.240	08/01/2010	\$62.590	08/01/2011 \$65.340
APPRENTICE: PILE DRIVER Local 56 Zone 1					
Ratio	Step	1	2	3	4
1:3	%	60.00	65.00	70.00	75.00
PIPEFITTER & STEAMFITTER	03/01/2009	\$65.980	09/01/2009	\$67.480	03/01/2010 \$68.790
APPRENTICE: PIPEFITTER Local 537					
Ratio	Step	1	2	3	4
**	%	40.00	45.00	60.00	70.00
** 1:3; 3:15; 1:10 thereafter					
Refrig/AC Mechanic **1:1;1:2,2:4;3:6,4:8;5:10;6:12;7:14,8:17;9:20;10:22(Q/W)					
Steps are 1 yr; Refrig/AC Mechanic Steps & Hrs Same as above					
PIPELAYER	06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010 \$48.350
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011 \$51.850
PLUMBERS & GASFITTERS	03/01/2009	\$65.500	09/01/2009	\$67.000	03/01/2010 \$68.250
APPRENTICE: PLUMBER Local 12					
Ratio	Step	1	2	3	4
**	%	35.00	40.00	55.00	65.00
** 1:2; 2:6; 3:10; 4:14; 5:19					
Steps are 1 year; Step 4 w/ License 70; Step 5 w/ License 80					
PNEUMATIC CONTROLS (TEMP.)	03/01/2009	\$65.980	09/01/2009	\$67.480	03/01/2010 \$68.790
PNEUMATIC DRILL/TOOL OPERATOR	06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010 \$48.350
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011 \$51.850
POWDERMAN & BLASTER	06/01/2009	\$47.100	12/01/2009	\$48.100	06/01/2010 \$49.100
	12/01/2010	\$50.350	06/01/2011	\$51.350	12/01/2011 \$52.600
POWER SHOVEL/DERRICK/TRENCHING MACHINE	06/01/2009	\$57.410	12/01/2009	\$58.530	06/01/2010 \$59.780
	12/01/2010	\$61.030			
PUMP OPERATOR (CONCRETE)	06/01/2009	\$57.410	12/01/2009	\$58.530	06/01/2010 \$59.780
	12/01/2010	\$61.030			
PUMP OPERATOR (DEWATERING, OTHER)	06/01/2009	\$47.070	12/01/2009	\$47.890	06/01/2010 \$48.810
	12/01/2010	\$49.740			
READY MIX CONCRETE DRIVER	05/01/2009	\$40.520	05/01/2010	\$41.080	05/01/2011 \$41.690
RECLAIMERS	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010 \$59.450
	12/01/2010	\$60.680			
RESIDENTIAL WOOD FRAME CARPENTER **	04/01/2009	\$35.620			
** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.					
RIDE ON MOTORIZED BUGGY OPERATOR	06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010 \$48.350
	12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011 \$51.850

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H



SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
Director of Labor

LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification	Effective Dates and Total Rates					
ROLLERS/SPREADER/MULCHING MACHINE	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430
	12/01/2010	\$60.680				
ROOFER (Inc. Roofer Waterproofing & Roofer Damproofing)	02/01/2009	\$53.860				
APPRENTICE: ROOFER Local 33						
Ratio	Step	1	2	3	4	5
**	%	50.00	60.00	65.00	75.00	85.00
		** 1:5, 2:6, 10 thereafter 1:10 (or portion thereof)				
		Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.				
Roofer (Reroofing): Same Steps and Hours as Above ** 1:4; Thereafter 1:1						
SHEETMETAL WORKER	08/01/2009	\$62.260	02/01/2010	\$63.510	08/01/2010	\$64.760
	02/01/2011	\$66.010	08/01/2011	\$67.260	02/01/2012	\$68.510
	08/01/2012	\$69.760	02/01/2013	\$71.010		
APPRENTICE: SHEET METAL WORKER Local 17 A						
Ratio	Step	1	2	3	4	5
1:4	%	40.00	45.00	50.00	60.00	65.00
		75.00 85.00				
		Steps 1-3 are 1 year; Steps 4-7 are 6 mos.				
SIGN ERECTOR	06/01/2009	\$37.780				
APPRENTICE: SIGN ERECTOR Local 35 Zone 2						
Ratio	Step	1	2	3	4	5
1:1	%	50.00	55.00	60.00	65.00	70.00
		75.00 80.00 85.00 90.00				
		Steps are 4 mos.				
SLATE / TILE / PRECAST CONCRETE ROOFER	02/01/2009	\$54.110				
SPECIALIZED EARTH MOVING EQUIP < 35 TONS	12/01/2008	\$42.530				
SPECIALIZED EARTH MOVING EQUIP > 35 TONS	12/01/2008	\$42.840				
SPRINKLER FITTER	03/16/2009	\$66.950	09/16/2009	\$68.450	03/16/2010	\$69.700
APPRENTICE: SPRINKLER FITTER Local 550						
Ratio	Step	1	2	3	4	5
1:1	%	40.00	45.00	50.00	55.00	60.00
		65.00 70.00 75.00 80.00 85.00				
STEAM BOILER OPERATOR	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430
	12/01/2010	\$60.680				
TAMPERS, SELF PROPELLED OR TRACTOR DRAWN	06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430
	12/01/2010	\$60.680				
TELECOMMUNICATION TECHNICIAN	03/01/2009	\$51.620	09/01/2009	\$52.540	03/01/2010	\$53.470
	09/01/2010	\$54.410	05/01/2011	\$55.330		
APPRENTICE: TELECOMMUNICATION TECHNICIAN Local 108						
Ratio	Step	1	2	3	4	5
1:1	%	40.00	45.00	50.00	55.00	60.00
		65.00 75.00 80.00				

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SUZANNE M. BUMP
Secretary of Labor and Workforce Development

GEORGE NOEL
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LAURA M. MARLIN
Commissioner of Division of Occupational Safety

Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification		Effective Dates and Total Rates					
TERRAZZO FINISHERS		08/01/2009	\$66.060	02/01/2010	\$66.950	08/01/2010	\$68.850
		02/01/2011	\$69.840	08/01/2011	\$71.940	02/01/2012	\$72.950
APPRENTICE: MARBLE TILE TERRAZZO FINISHER Local 3 Marble & Tile							
Ratio	Step	1	2	3	4	5	
1:3	%	50.00	60.00	70.00	80.00	90.00	
Steps are 800 hrs.							
TEST BORING DRILLER		06/01/2009	\$47.500	12/01/2009	\$48.500	06/01/2010	\$49.500
		12/01/2010	\$50.750	06/01/2011	\$51.750	12/01/2011	\$53.000
TEST BORING DRILLER HELPER		06/01/2009	\$46.220	12/01/2009	\$47.220	06/01/2010	\$48.220
		12/01/2010	\$49.470	06/01/2011	\$50.470	12/01/2011	\$51.720
TEST BORING LABORER		06/01/2009	\$46.100	12/01/2009	\$47.100	06/01/2010	\$48.100
		12/01/2010	\$49.350	06/01/2011	\$50.350	12/01/2011	\$51.600
TRACTORS/PORTABLE STEAM GENERATORS		06/01/2009	\$57.090	12/01/2009	\$58.190	06/01/2010	\$59.430
		12/01/2010	\$60.680				
TRAILERS FOR EARTH MOVING EQUIPMENT		12/01/2008	\$43.130				
TUNNEL WORK COMPRESSED AIR		06/01/2009	\$58.430	12/01/2009	\$59.680	06/01/2010	\$60.930
		12/01/2010	\$62.180	06/01/2011	\$63.430	12/01/2011	\$64.680
TUNNEL WORK COMPRESSED AIR (HAZ. WASTE)		06/01/2009	\$60.430	12/01/2009	\$61.680	06/01/2010	\$62.930
		12/01/2010	\$64.180	06/01/2011	\$65.430	12/01/2011	\$66.680
TUNNEL WORK FREE AIR		06/01/2009	\$50.500	12/01/2009	\$51.750	06/01/2010	\$53.000
		12/01/2010	\$54.250	06/01/2011	\$55.500	12/01/2011	\$56.750
TUNNEL WORK FREE AIR (HAZ. WASTE)		06/01/2009	\$52.500	12/01/2009	\$53.750	06/01/2010	\$55.000
		12/01/2010	\$56.250	06/01/2011	\$57.500	12/01/2011	\$58.750
VAC HAUL		12/01/2008	\$42.550				
WAGON DRILL OPERATOR		06/01/2009	\$46.350	12/01/2009	\$47.350	06/01/2010	\$48.350
		12/01/2010	\$49.600	06/01/2011	\$50.600	12/01/2011	\$51.850
WASTE WATER PUMP OPERATOR		06/01/2009	\$57.410	12/01/2009	\$58.530	06/01/2010	\$59.780
		12/01/2010	\$61.030				
WATER METER INSTALLER		03/01/2009	\$65.500	09/01/2009	\$67.000	03/01/2010	\$68.250

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Massachusetts General Laws, Chapter 149, Sections 26 to 27H



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Awarding Authority: City of Newton

Contract Number: 10-07

City/Town: NEWTON

Description of Work: Re-Bid for the Newton Free Library, Variable Frequency Drive Replacement

Job Location: 330 Homer Street, Newton MA

Classification

Effective Dates and Total Rates

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c.23, ss. 26 27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c.23, ss. 11E 11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c.23, ss. 11E 11L.

All steps are six months (1000 hours) unless otherwise specified**.

* Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof.

** Multiple ratios are listed in the comment field.

*** The job site ratio of 2 apprentices(App) for every 3 journeymen(JM) is allowed as follows:

1 JM:1 App; 2 3 JM:2 App; 4 6 JM:4 App; 7 9 JM:6 App; 10 12 JM:8 App; 13 15 JM:10 App; etc.

This wage schedule must be posted at the work site in accordance with M.G.L. ch. 149, sec. 27

Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. ch. 149, sec. 27. Employees not receiving such rates should report the violation to the Office of Fair Labor and Business Practices, 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465.

Issue Date: 08/10/2009

Wage Request Number: 20090810-022

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WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit a copy of there weekly payroll records to the awarding authority. This is required to be done on a weekly basis. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor or public body shall furnish to the Department of Labor & Workforce Development/Division of Occupational Safety within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 200_____

I, _____,

(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

_____ on the _____

(Contractor, subcontractor or public body)

(Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

DIVISION OF OCCUPATIONAL SAFETY, 399 WASHINGTON STREET, 5TH FL., BOSTON, MA. 02108

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PLANS MUST BE OBTAINED THROUGH RDK ENGINEERS

7 Pages of Drawings
Must be obtained through the RDK Engineers
(Call 978-475-0298 or email lferreira@rdkengineers.com for availability)

DIVISION 1

SECTION 00840

INSURANCE REQUIREMENTS

1.01 GENERAL

- A. This section specifies the Owner's insurance requirements and relates to the General Conditions of the Contract for Construction and the Supplement to the Standard Form of Agreement Between Owner and Contractor.
- B. Provisions of the General Conditions of the Contract for Construction and Supplement to the Standard Form of Agreement Between Owner and Contractor which are not modified by the following insurance requirements remain in full effect.
- C. The Owner, at its own expense, will carry a Builder's Risk endorsement on its property insurance policy. The Builder's Risk endorsement on its property insurance policy. The Builder's Risk endorsement will cover all materials on the project site which may, at the time of any damage, be owned by the Contractor, but which are or will become part of the project.
- D. The Bidder must have DCAM Certification as an HVAC Contractor and Certified as a Prime Bidder.

1.02 INSURANCE REQUIREMENTS

- A. The insurance required shall be written for not less than the limits of liability required by law or the following limits, whichever is greater:

State and Federal Workmen's Compensation	Statutory
Employer's Liability (Each Accident)	\$ 500,000
Benefits required by Union Contract	As required

GENERAL LIABILITY*

General Liability - Bodily Injury/Death Each Occurrence	\$1,000,000
General Liability - Bodily Injury Aggregate	\$3,000,000
General Liability - Property Damage Each Occurrence	\$1,000,000
General Liability - Property Damage Aggregate	\$3,000,000

General Liability shall include coverage for the following:

Comprehensive Form
Premises/Operations Liability
Explosion, Collapse and Underground (XCU)
Products/Completed Operations
Contractual Liability
Independent Contractors
Broad Form Property Damage
Personal Injury Including Libel and Slander Coverage
Broad Form CGL Endorsement

AUTOMOBILE LIABILITY**

Comp. Automobile Liability - Bodily Injury Per Person	\$ 1,000,000
Comp. Automobile Liability - Bodily Injury Per Accident	\$ 1,000,000
Comp. Automobile Liability - Property Damage	\$ 1,000,000

EXCESS LIABILITY (UMBRELLA COVERAGE)

Bodily Injury and Property Damage Combined Each Occurrence	\$ 2,000,000
Bodily Injury and Property Damage Combined Aggregate	\$ 2,000,000

B. Exclusions: The Owner's property insurance shall not cover tools, equipment, shoring, staging, forms, temporary buildings or other equipment owned or rented by the Contractor, its Subcontractors, or any worker.

C. Insurance Certificates: The Contractor and all subcontractors who are required to provide insurance under the Contract shall provide accurate and bona fide "Certificates of Insurance" issued by a responsible agent of the insurance company.

1. Certificate Content: Such "Certificates of Insurance" shall clearly indicate the insurance coverage provided including all riders and limits specified. Each "Certificate of Insurance" shall be accompanied by a sworn and duly notarized statement from the responsible agent of the insurance company issuing the Certificate clearly stating that all insurance specified and required by the Contract Documents is provided and in force, and also a clear statement of all exceptions and deviations, if any, from the Contract Document insurance requirements.

2. Responsibility: The insurance agent issuing and authorizing the "Certificate of Insurance" shall be responsible and liable for the accuracy and validity of the "Certificate of Insurance". Each insured party shall certify by sworn and duly notarized statement that the "Certificates of Insurance" issued for them are bona fide.

3. Disclaimers Prohibited: "Certificates of Insurance" shall not contain any disclaimers such as: "This Certificate is issued as a matter of information only and confers no rights upon the certificate holder. This Certificate does not amend, extend, or alter the coverage afforded by the policies listed below." Disclaimers are not acceptable.

4. Certificates of Insurance Can Be Relied Upon: Parties receiving "Certificates of Insurance" shall be entitled to rely upon the "Certificates of Insurance" and shall have the right to claim the benefits and protection provided by the insurance as it applies to them.

5. Alternate to "Certificates of Insurance": Instead of providing the "Certificates of Insurance" and the sworn statements required above, the insured may provide bona fide and accurate copies of all insurance policies and riders accompanied by a sworn and duly notarized statement from the insured that the policies, riders, and documents submitted are bona fide and valid, and that parties receiving the insurance documents may rely on the documents as satisfaction of the Contract insurance requirements.

END OF SECTION

DIVISION 1

SECTION 01000

GENERAL REQUIREMENTS

01010 SUMMARY OF WORK

1.01 CONTRACT DOCUMENTS

The general provisions of the Contract Documents and General Conditions apply to the work specified in this section.

1.02 SPECIFICATION ARRANGEMENT

Titles to and arrangements of sections and paragraphs in these specifications are used merely for convenience and shall not be taken as a correct or complete segregation of the several categories of materials, equipment and labor, nor as an attempt to outline or define jurisdictional procedures.

1.03 INTENT

The entire work provided for in these technical specifications and on the Drawings shall be constructed and finished in every respect in a good workmanlike and substantial manner. All parts necessary for the proper and complete execution of the work whether the same may have been specifically mentioned or not, or indicated in a manner corresponding with the rest of the work shall be provided as if the same were particularly described and specifically provided for herein. It is not intended that the Drawings shall show every detailed piece of material or equipment, but such parts and pieces as may be in accordance with the best practices and regulatory requirements, even though not shown, shall be furnished and installed. All materials and equipment shall be new, unless specifically stated otherwise in these Contract Documents.

1.04 SCOPE

The work required by these specifications shall include furnishing all labor, skill, supervision, tools, construction plant, equipment and materials and performing all operations necessary for the properly completed contract work as shown on the Drawings, as mentioned in these specifications, and as evidently required, to the complete satisfaction of the Engineer.

1.05 GENERAL DESCRIPTION OF WORK

The work consists of replacing the existing variable speed drives with new high efficiency variable speed drives. In addition, the supply and return fan motors shall be replaced with premium efficiency motors. The existing pneumatic control system controlling the variable speed drives shall be replaced with electronic pressure sensors and related wiring. The work includes but is not limited to:

1. New variable speed drives
2. New premium efficiency motors
3. Demolition of existing drives and motors
4. New electrical connectors to new components
5. New direct digital controls for variable speed drives

6. Start up, adjust and balancing

1.06 PRE-CONSTRUCTION CONFERENCE

1. Within ten days of the contract execution and prior to the start of construction there will be a pre-construction meeting between the Contractor, representatives of the Owner and the Engineer to discuss methods of construction and completion of the project.
2. Representatives of the following shall be required to attend this conference:
 - a. Owner
 - b. Engineer
 - c. General Contractor
 - d. All Sub-Contractors
3. Contractors shall make specified pre-construction submissions including the following, if not already submitted:
 - a. Typed list of sub-contractors, with addresses and telephone numbers, and the name of principal contract.
 - b. Certificate of Insurance
 - c. Performance and Payment Bonds
 - d. Construction Schedule
 - e. Schedule of Values
 - f. Schedule of Monthly Construction Payments
4. Agenda will include the following items:
 - a. Tentative construction schedule
 - b. Critical work sequencing
 - c. Designation of responsible personnel
 - d. Submittal of shop drawings, project data and samples
 - e. Processing applications for payment
 - f. Procedures for maintenance of record documents
 - g. Procedures for field changes, change estimates, change orders, etc.
 - h. Use of premises
 - i. Location and maintenance of temporary storage buildings, field offices, etc.
 - j. Major equipment deliveries and priorities
 - k. Site and building security procedures
 - l. Procedures for submitting Prevailing Wage Rates sheets.

01011 CONTRACT INCLUDES (LIST OF DRAWINGS)

T0.00	TITLE SHEET
H0.00	HVAC – LEGEND, NOTES & ABBREVIATION
H2.00	HVAC – FLOOR PLAN NEW WORK
H7.00	HVAC – CONTROL AND GENERAL NOTES
ME1.01	MECHANICAL/ELECTRICAL – THIRD FLOOR NEW WORK & LEGEND
ME1.02	MECHANICAL/ELECTRICAL – SCHEDULE
ME1.03	MECHANICAL/ELECTRICAL – POWER RISER DIAGRAM & GENERAL
NOTES	NOTES

01012 ORDER OF AND COMPLETION OF WORK

- 1.01 Upon the award of the contract, the Contractor shall commence work immediately, carry it on with all reasonable and proper activity and dispatch, give all notices, take out all permits and pay all charge, fees and rates therefore, and bring the work to entire completion within the period of time specified in the contract. "Entire Completion" as herein used, shall be construed as meaning the completion of all work as called for by these specifications and the contract executed in accordance herewith and the date when such completion takes place will be decided by the Engineer.

01013 PROTECTION - IN GENERAL

- 1.01 The Contractor is to cover and protect his work and materials from all damage during the process of the work and deliver the whole in a clean perfect condition.

01014 CONSTRUCTION RISKS

- 1.01 The Contractor will understand that the materials, work in place and equipment, are entirely at his risk, including loss by theft or fire during the construction period, and he will be held responsible and liable for its safety.

01015 SANITARY ACCOMMODATIONS

- 1.01 Make arrangements with the awarding authority for use of a designated toilet.

01016 UTILITIES

- 1.01 Water and electric power shall be available from existing sources where Contractor's use is not excessive and does not interfere with normal use of the buildings. Where existing utilities of the facilities are not adequate or cannot be used, the Contractor is responsible for providing alternative sources, the cost of which is to be included in bid price. The use of the facility's utilities shall be coordinated through the Engineer.
- 1.02 Fuel oil, temporary lighting, gas and other utilities (except for heating the school) shall be provided by the Contractor, the cost of which is to be included in the Bid Price.
- 1.03 The Contractor shall be allowed the use of a designated toilet room and shall clean and sanitize the toilet room at the end of each work day.
- 1.04 The Contractor shall provide all wiring, cables, hoses, safety devices, switches, etc., necessary for the utilities used by the Contractor and remove the same upon completion.
- 1.05 The Contractor shall be responsible for all materials, equipment and the associated costs to provide temporary heat to the school, in the event of delays.

01017 RECORD DRAWINGS

- 1.01 The Contractor shall maintain at the job site, at all times, a complete and separate set of black line prints of the Drawings on which he shall mark clearly, accurately, and promptly as the work progresses, any changes in the work made by change orders or other instructions issued by the Engineer. These drawings shall be used daily to record the progress of the work by coloring in the various pipes, equipment and associated appurtenances when installed. This progress shall incorporate both the above stated changes together with all other deviations from the design, whether resulting from the job conditions encountered in the field or from any other cause. Principal dimensions of all concealed work and valve numbers shall be recorded as applicable.

1.02 The marked-up prints shall be used as a guide in determining the progress of work installed. The Engineer will inspect these prints periodically and if found to be inaccurate or incomplete, they shall be corrected immediately.

1.03 At completion of work these marked-up prints shall be the basis of the preparation of the final record drawings. Each drawing shall be marked "RECORD AS BUILT DRAWINGS" and dated when printed. Two complete and reproducible sets of as-built drawings must be submitted before final acceptance of the work. The cost of preparing the record drawings shall be borne by the Contractor.

01018 ENGINEERING (Refer to "General Specifications")

01019 OFFICE (none required)

01020 VISITATION TO SITES

1.01 All bidders shall, before submitting a bid, visit the sites to familiarize themselves with existing conditions. Lack of knowledge of on-site conditions shall not be cause for changes to the contract values.

01021 DISPOSAL OF WASTE MATERIALS

1.01 The Contractor shall be responsible for the removal of all waste material and equipment from the site.

1.02 The Contractor shall be responsible for the removal of all hazardous materials and improperly licensed disposal sites, disposal and transportation permits.

01022 BUILDING SECURITY

1.01 The Owner will provide security for the building, however, it shall be the responsibility of the Contractor to secure all exit doors in the area where work is to be performed, coordinating same with the chief custodian or an assigned representative of the Owner. The Owner will not provide security or be responsible for the Contractor's property, fixtures, fittings, tools, equipment, etc.

01023 ACCESS TO BUILDING

1.01 The buildings will be opened during regular working hours only. Exceptions to this clause may be made by mutual agreement between the Owner and Contractor in the initial phase of the project.

01024 PUBLIC PROTECTION

1.01 While the work is in progress, erect safe barricades to effectively protect persons from injury.

1.02 Protect all ground areas where stationary equipment is placed and protect wall areas from hoisting or material conveyers.

01025 CUTTING & PATCHING

1.01 GENERAL REQUIREMENTS

- a) All of the contract documents including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this Section.

1.02

WORK INCLUDED

- a) The intent of this Section is to describe, in general, procedures for performance of minor alterations, minor removals, and cutting and patching including:
 - 1) All necessary cutting, coring, drilling, grouting, and patching to fit together the several parts of the work including repairs in kind of disturbed existing surfaces.
 - 2) Where conflicts exist between the requirements specified herein and those of the Technical Trade Sections, those of the Trade Sections shall prevail.
- b) The Contractor shall be responsible for all cutting, coring, drilling, grouting, fitting and patching of the work that may be required to make its several parts come together properly and fit, as shown upon, or reasonably implied by, Drawings and Specifications for completed structure, and he shall make good after them as Engineer may direct.
- c) Expense caused by defective or ill-timed work shall be borne by the Contractor.

1.03

CUTTING AND PATCHING OPERATIONS

- a) Patch and refinish to match adjacent work in quality and appearance at locations where installed work has been installed and requires reworking to accommodate other work, or has been damaged.
- b) Patch and match using skilled mechanics. The quality of patched or extended work shall be not less than that specified for new work.
- c) Patch or replace any portion of a finished surface which is found to be damaged, lifted, discolored, or shows other imperfections, with matching material.
 - 1) Provide adequate support or substrate prior to patching the finish.
 - 2) Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
 - 3) When surface finish cannot be matched, refinish the entire surface to the nearest intersections.
- d) Make the transition as smooth and workmanlike as possible. Patched work shall match adjacent work in texture and appearance so that the patch or transition is invisible to the naked eye at a distance of five feet.

END OF SECTION

DIVISION 1

SECTION 01100

SPECIAL CONDITIONS

PART 1 - GENERAL

1.01 RESPONSIBILITY AND COMPLIANCE

- A. All requirements set forth under this Section are directed to the General Contractor.
- B. Be responsible for arranging for facilities as specified herein and as required for proper and expeditious prosecution of the work. Pay costs for such general services and temporary facilities, except as otherwise specified, until final acceptance of the work, and remove same at completion of work.
- C. Comply with applicable OSHA, state, and municipal regulations and requirements for services and facilities required under this SECTION, and in performance of all requirements of this Contract.

1.02 COORDINATION OF THE WORK

- A. The Contractor shall coordinate all work with all adjacent work and shall cooperate with all other trades so as to facilitate general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their respective work and for the storage of their materials and equipment. The Contractor shall be responsible for coordination.
- B. The Contractor shall assume responsibility for the correctness and adequacy of his work. The Contractor shall be responsible for and pay for all damages done by his work or his workmen.
- C. The Contractor shall cooperate with, and provide access and working area to other Owner's contractors for the performance of specific work assigned to them.

1.03 PROJECT MEETINGS

- A. The Contractor will be required to meet with the Owner, Engineer and the Owner's representatives, at the site of the work, at regular intervals during the course of the contract for purposes of progress review, coordination of shop schedules, sample submittals, and any other items of work requiring such coordination. The dates of such meetings shall be as established by the Engineer and mutually agreed upon by the Contractor, the Engineer, and the Owner's Representative.

1.04 EXISTING BUILDING CONDITIONS

- A. Before ordering any materials or doing any work, verify all measurements and existing building conditions and be responsible for the correctness of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the measurements indicated on the Drawings; any difference which may be found shall be submitted to the Engineer in writing for consideration before proceeding with the work.

1.05 PROTECTION OF EXISTING CONDITIONS

A. Take all proper precautions to protect the Owner and adjoining property from injury and unnecessary interference; and replace or put in good condition any existing items which are damaged or injured in carrying out the work, unless designated to permanently be removed or demolished.

B. Keep all access drives and walks clear of debris during building operations. Repair streets, drives, curbs, sidewalks, poles, and the like, where disturbed by building operation and leave them in as good condition after completion of the work as before operations started. Floors, stairwells, and corridors must be kept clean of debris and means of egress maintained.

1.06 TESTS AND INSPECTION

A. Make, or have made, such tests and inspections on workmanship and materials as may be required by the building code, state or municipal laws, or as called for under the various SECTIONS of this Specification.

B. Bear all expense to such tests and inspections, unless otherwise specified under the various SECTIONS of the Specifications and furnish all labor, tools, instruments, water, temporary power and light, construction, and equipment necessary for these tests and inspection. Furnish records of all tests and inspections to the Engineer. Remove all temporary work, materials, and equipment upon completion of tests and inspections.

C. Where, the various SECTIONS of the Specifications, inspections and testing of materials, processes, and the like is called for, the selection of bureaus, laboratories, and/or agencies for such inspection and testing shall be subject to the approval of the Engineer.

D. Should any material or work be found, after testing or inspections, to be defective or inferior, remove and replace such material and/or work with new sound materials and/or work as approved by the Engineer, and bear all costs thereof.

1.07 FIRE PROTECTION AND PREVENTION

A. Comply with the following minimum requirements for fire prevention:

1. Provide the services of a City of Newton Firefighter during all welding/cutting operations performed within the school (i.e., demolition).

2. Provide sufficient quantity of carbon dioxide fire extinguishers in all areas of work.

3. Do not permit an accumulation of inflammable rubbish to stay in the building overnight.

4. Store no more than one gallon, in an approved safety can or sealed container, of any volatile inflammable liquid in any portion of the building.

5. Keep all used paint rags in a can with sufficient water to cover.

6. Make arrangements for periodic inspection by local fire protection authorities and insurance underwriters' inspections. Cooperate with said authorities to facilitate proper inspection of the premises. Comply with all applicable laws and ordinances and with the Owner's fire prevention requirements.

7. Ensure that tarpaulins that may be used during construction of work are made of material which is resistant to fire, water, and weather, are U.L. approved, and comply with FS-CCC-D-746.

1.08 ACCIDENT PREVENTION

- A. Comply with all federal, state and municipal recommendations and requirements for safety, and accident prevention, and those of the Associated General Contractors of America, and the American Standards Association Standard A10.2. Ensure that the field superintendent conducts regular, frequent inspections of the site for compliance with safety regulations.
- B. Neither the Owner nor the Engineer shall be responsible for providing a safe working place for the Contractor, contractors, or their employees, or any individual responsible to them for the work.

1.09 WELDING AND CUTTING

- A. Where electric or gas welding or cutting work is done above or within ten (10) feet of combustible material or above space that may be occupied by persons, use interposed shields of incombustible material to protect against fire damage or injury due to sparks and hot metal.
- B. Place tank supplying gases for gas welding or cutting at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright position where practicable. Such tanks, when stored for use, shall be remote from any combustible material and free from exposure to the rays of the sun or high temperatures.
- C. Maintain suitable fire extinguishing equipment near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, thoroughly wet down the surroundings adjacent to welding and cutting operations.
- D. Station a workman equipped with suitable fire extinguishing equipment near welding and cutting operations to see that sparks do not lodge in floor cracks or pass through floor or wall openings or lodge in any combustible material. Keep the workman at the source of work which offers special hazards for thirty (30) minutes after the job is completed to make sure that smoldering fires have not been started.
- E. Place a qualified electrician in charge of installing and repairing electric or arc welding equipment.
- F. All welding and cuttings shall be performed by certified welders.
- G. No welding and cutting is permitted during library hours. Welding is permitted either before or after normal operating hours which are typically 9:00am to 9:00 pm.

1.10 OVERLOADING

- A. Do not permit materials and fabricated work to be stacked on, or be transported over, floor and roof construction that would stress any of said construction beyond the designed live loads.

1.11 RUBBISH REMOVAL

- A. Ensure that each workman engaged upon the work bears his full responsibility for cleaning up during and immediately upon completion of his work, and removes all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work, but this shall in no way be construed to relieve the Contractor of his primary responsibility for maintaining the building and site clean and free of debris, leaving all work in a clean and proper condition satisfactory to the Engineer and/or Owner.

- B. Do not permit rubbish to be thrown from the windows of the building.
- C. Immediately after unpacking, all packing materials, case lumber, excelsior, wrapping or other rubbish, flammable or otherwise, shall be collected and removed from the building and premises.

1.12 BLASTING

- A. No blasting will be permitted.

1.13 WORK AREAS, STORAGE, ACCESS, AND PARKING

- A. The Contractor's work areas shall be as designated on the Drawings, and shall be strictly adhered to. Access to the existing building shall be kept free of all obstructions at all times. Assume full responsibility for trespass on and/or damage to other property by any person employed on the project.
- B. A storage area for construction materials will be designated for the use of the Contractor. Storage of materials beyond the designated area will not be permitted.
- C. Vehicular access to the site, and parking for employees' vehicles shall be restricted only to the specific areas designated by the Owner.

1.14 TEMPORARY SCAFFOLDING AND CONVEYANCES

- A. Furnish, install, maintain, remove and pay for all temporary staging and planking, ladders, hoisting (including operator), rigging, and safety devices for all trades.
- B. Staging shall be approved design, erected and removed by experienced stage builders and shall have all accident prevention devices required by state and local laws.
- C. Permit no materials to be passed through the finished openings of exterior walls, without first providing protection to the opening thereof of a type as approved by the Engineer. Be responsible, and bear all costs, for repairs and/or replacement of damaged work caused thereby.

1.15 TEMPORARY PROTECTION

- A. Furnish, erect, and maintain for the duration of the work period, temporary fire-retardant, dustproof coverings as required to prevent the spread of dust beyond the immediate area where work is being performed.
 - 1. No painting during school hours.
 - 2. No cutting, welding, asbestos abatement or demolition during school hours.
 - 3. No rigging of equipment during school hours.
 - 4. No power shutdowns during school hours.
- B. Contractor shall cover and protect all school furnishings and equipment in each classroom while work is performed in that classroom.

1.16 ADVERTISING MATTER

- A. Signs or advertisements will not be allowed on building enclosure or premises, unless written approval has been obtained from the Owner.
- B. Advertising matter shall not appear on equipment, unless so specified. However, nameplates of a nominal size and inconspicuous nature will be permitted.

1.17 MUNICIPAL POLICE AND FIRE DEPARTMENT SERVICES

- A. Make all necessary arrangements with the municipal police and fire departments in advance of times when regular off-duty, or reserve police officers or firemen will be needed for traffic control protection or fire watch, due to the operations performed under this Contract. Pay police officers and firemen at the prevailing wage rates in the municipality for such services. Extend the Workingmen's Compensation Insurance and Employer's Liability Insurance, required under the General Contract to cover police and firemen used on the project. Fire watch will be required during demolition of existing feed tank.

1.18 USE AND OCCUPANCY PRIOR TO ACCEPTANCE BY THE OWNER

- A. The building will be occupied, for normal function thereof, during the stipulated construction period.

1.19 GLASS BREAKAGE

- A. The contractor shall be responsible for all breakage of glass as a direct or indirect result of his work or actions of his workmen, from the time the construction operations commence until the project is complete. Replace all broken glass and deliver the building with all glazing intact and clean.

1.20 DAMAGE TO EXISTING SURFACES

- A. The Contractor shall be fully responsible for any damage to existing surfaces caused by the operations of this Contract, and shall correct all such damage to the Owner's satisfaction, at no additional cost to the Contract.

1.21 FINAL CLEANING

- A. Before the final inspection, thoroughly clean the entire exterior and interior areas of the building where construction work has been performed, the immediate surrounding areas, and corridors, stairs, halls, storage areas, temporary offices and toilets, including the following:
 - 1. Remove all construction facilities, debris, and rubbish from the Owner's property and legally dispose of same beyond the site limits.
 - 2. Sweep, dust, wash, and polish all finished surfaces. This includes cleaning of the work of all finished trades where needed, whether or not cleaning for such trades is included in their respective SECTIONS.

END OF SECTION

DIVISION 1

SECTION 01300 REMOVAL OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 CONTRACT DOCUMENTS

A. The general provisions of the Contract Documents and General Requirements apply to the work in this section.

1.02 DESCRIPTION

A. The work covered under this section includes furnishing of all labor and equipment and coordinating the efforts of the contractors in connection with performing the required demolition/removal indicated on the Drawings, and in accordance with these Specifications.

B. This section is intended to clarify those items of removal/demolition which are the responsibility of the Contractor.

C. All equipment and material called for removal shall become the property of the Contractor. If the Owner selects to retain ownership of said items, the Contractor doing the removal shall place the equipment in a location such that it is available for the Owner to pick up and transport in its own vehicles. All equipment and materials that the Owner decides to discard shall be properly disposed of offsite by the Contractor at no cost to the Owner.

D. The Contractor shall provide all labor, materials, equipment and scheduling necessary in order to demolish/remove those items specified on the Contract Drawings for demolition/removal and shall be responsible for any degree of unforeseen difficulty in the removal of said items.

E. Every effort has been made to indicate to the Contractor those items to be removed or demolished. All removal and demolition work is included in the lump sum price bid for the respective contract. It is the Contractor's responsibility to visit the site of the construction to ascertain the extent and complexity of the work involved. There will be no additional payment, due to the Contractor's failure to anticipate problems or due to delays caused by the need to coordinate the removal work with the installation of new materials or equipment or the work of other contractors.

1.03 RECORDS OF DEMOLITION WORK

A. The Contractor shall be responsible for coordinating and recording demolition work.

B. The Contractor shall record all removal work on a set of design drawings for the existing site.

C. Immediately following completion of demolition work for each site, the Contractor shall submit a marked-up set of drawings to the Engineer showing all demolition work.

1.04 SUBMITTALS

A. In compliance with the requirements established with the Contract, the Contractor shall provide the following:

1. Permit for transport and disposal of debris.
2. Demolition procedures and operational sequence for review and acceptance by the Engineer.
3. Signed receipts from disposal sites for hazardous and/or nonhazardous wastes must be delivered to the Owner prior to any payment made to the Contractor for that work.

PART 2 - PRODUCTS

Not Applicable.

PART 1 - PART 3 - EXECUTION

3.01 GENERAL

- A. No removal or demolition shall occur without the approval of the Engineer. All demolition/removal shall be coordinated by the Contractor.

3.02 DEMOLITION BY THE CONTRACTOR

- A. The demolition work intended for the Contractor shall include overall coordination of the removal/demolition work and removal and storage of all associated materials.
- B. The work under this category includes, but is not limited to the following items:
 1. Existing variable speed drives.
 2. Existing supply and return fan motors and accessories.
 3. Pneumatic tubing no longer required for control of variable volume systems.
 4. All demolition/removal work shown on the Drawings or specified shall be performed by the Contractor.

END OF SECTION

DIVISION 1

SECTION 01310

SCHEDULE OF WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The Contractor, as a minimum, shall fulfill the Contract Schedule specified hereinafter.
- B. Provide all necessary manpower, overtime work, materials and equipment, permits, etc., to complete the contract schedule. The building will be available as listed in Supplementary Conditions, Paragraph I: Working Hours. In general, buildings are available Monday through Friday, 7 a.m. to 3 p.m. Additional hours approved by the City and paid for by the contractor should be agreed to by the City of Newton.
- C. All cutting in occupied areas shall be performed during unoccupied periods.
- D. A legal means of egress shall be maintained during construction at all times.
- E. During fire alarm drills, the Contractor shall immediately clear the area of work and provide complete safe access through the work area. Review this procedure with the Building Department and Fire Department.

1.02 CONTRACT SCHEDULE

- A. Work under this contract shall commence on or about September 12, 2009.
- B. Work under this contract shall be substantially completed no later than November 12, 2009.
- C. Work under this contract shall be completed by December 3, 2009.

1.03 LIQUIDATED DAMAGES

- A. The work shall be completed on or before said dates. In case the work embraced in this contract shall not have been completed due to the failure of the Contractor to complete the work or any part of the work within the time specified, the Awarding Authority shall recover as liquidated damages \$1,000.00 per day for every day beyond the contract completion dates or completion dates as extended in accordance with Article 8.3 of A201-1997.
- B. Owner and Contractor recognize that Owner will suffer financial loss if the work is not completed on schedule, thus, such liquidated damages for delay reflect an agreed upon approximation of loss suffered by Owner because of such delay and do not constitute a penalty.

END OF SECTION

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SECTION 15500

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.00 GENERAL PROVISIONS

- A. The GENERAL REQUIREMENTS, DIVISION 1, and BIDDING AND CONTRACT REQUIREMENTS, and DIVISION 0 are hereby made a part of this Specification Section.
- B. Examine all Drawings and all Sections of the Specifications and requirements and provisions affecting the work of this Section.

1.01 SCOPE OF WORK

- A. This project includes the partial renovation of the existing mechanical room and building controls at the Newton, Massachusetts Free Library. This work includes the replacement of existing variable frequency drives presently serving the following motors; AHU-1, 2, 3, and 5; RF-1, 2, 3, 4 and the replacement of motors for AHU-1, 2, 3, and 5; RF-1 & 4. Selective demolition of existing systems shall be required.
- B. This work includes the installation of new motor controls and the entire existing system serving the mechanical room shall be balanced.
- C. Refer to the specific requirements for this project included in the "Narrative Report for Compliance with the Energy Conservation Section of the Massachusetts State Building Code (780CMR) – Approval and Acceptance", which shall be considered part of these specifications. Include all associated testing and certifications necessary for compliance and any required remedial actions and retesting due to failure.
- D. The building is to be commissioned and contractor shall provide all labor required to fully test and demonstrate that all systems operate as designed.
- E. The work under this Section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:
 - 1. Identification
 - 2. Electric Motors and Starters
 - 3. Equipment Nameplates
 - 4. Variable Frequency Drive (VFD) Motors
 - 5. Relocation of existing HVAC components that interfere with new construction and removal and disposal of obsolete components.
 - 6. Operating and maintenance instructions and manuals
 - 7. Coordination drawings
 - 8. Shop drawings
 - 9. Testing, Adjusting, & Balancing of all Ducted Systems and Equipment

10. Record (as-built) Drawings
 11. HVAC Control Systems
 12. Training of Owners Personnel on Equipment, Systems, and Controls
- F. The work to be done under this section is generally shown on the Mechanical HVAC Drawings.

1.02 RELATED WORK

- A. Principal classes of Work related to the Work of this Section are listed below, and are specified to be performed under the indicated Sections of these Specifications. Refer to the indicated Sections for description of the extent and nature of the indicated Work, and for coordination with related trades. This listing may not include all related Work items. It is the responsibility of the Contractor to coordinate the Work of this Section with that of all other trades.
- B. The following work is not included in this section and will be provided under other sections, except as specified herein:
1. Electrical power wiring for all HVAC equipment and to junction box(es) in mechanical areas. Power wiring from these box(es) to all control equipment (control panels, etc.) and all controls/interlock wiring shall be provided by the controls contractor. Control wiring shall be from standby power source (if available).
 2. Temporary light, power, water, heat, gas and sanitary facilities for use during construction and testing. Refer to Division 1, General Conditions.

1.03 DEFINITIONS

- A. As used in this Section, the following terms shall be understood to have the following meaning:
1. **“Work”** shall mean all labor, materials, equipment, apparatus, controls, accessories and all other items required for a proper and complete installation.
 2. **“Concealed”** shall mean hidden from sight in chases, furred in spaces, shafts, embedded in construction, in a crawl space, and above hung ceilings.
 3. **“Exposed”** shall mean not installed underground or concealed as defined above.
 4. **“Furnish”** shall mean purchase and deliver to the project site, complete with every necessary appearance and support.
 5. **“Install”** shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting, proper location and operation in the project.
 6. **“Provide”** shall mean furnish and install.
 7. **“Piping”** shall mean, in addition to pipe or tubing, all fittings, flanges, grooved joint couplings, unions, valves, strainers, drains, hangers and other accessories relative to such piping.

8. **"Furnished by others"** shall mean materials or equipment purchased and set in place under other sections of the general contract and connected to the systems covered by this section of the specifications by this trade contractor.
9. **"Coordinate"** shall mean all work provided under this section of the specification shall be in compliance with work of other trades.
10. **"HVAC Subcontractor," "Subcontractor," or "Installing Contractor"** shall be the Subcontractor responsible for the Work of this Section of the Specifications, and shall be responsible for coordination of the Work of this Section of the Specifications with the Work of the ATC Contractor.
11. **"ATC"** shall mean Automatic Temperature Controls, and shall be interchangeable with Building Automation System.
12. **"Owner's Representative"** shall be the party responsible to make decisions regarding all contractual obligations in reference to the Scope of Work for the Owner.
13. **"Date of Substantial Completion"** shall indicate the date where the work has been formally accepted as evidenced by completed final punch list or where the work has reached the stage that the owner obtains beneficial use and commences utilization of the installed systems for business or occupancy purposes. The GENERAL REQUIREMENTS, DIVISION 1, shall supercede this definition where specifically defined.

1.04 CODES, REFERENCES AND PERMITS

- A. Materials, installation of systems and equipment provided under this section shall be done in strict accordance with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, and any other Codes and Regulations having jurisdiction including but not limited to:
 1. All Applicable NFPA Standards
 2. State and Local Building Mechanical, Electrical, and Energy Codes
 3. American Society of Mechanical Engineers (ASME)
 4. American Society of Testing and Materials (ASTM)
 5. American National Standards Institute (ANSI)
 6. Underwriters' Laboratories, Inc. (UL)
 7. Occupational Safety and Health Administration (OSHA)
 8. Any other local codes or authorities having jurisdiction.
- B. All equipment shall meet the more efficient requirement:
 1. As shown on bid documents,
 2. Minimum efficiencies state in ASHRAE 90.1-2007, or
 3. Minimum efficiencies stated in the governing Energy Code.

- C. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, except when more rigid requirements are specified or are required by applicable codes but not limited to:
1. Air-Conditioning and Refrigeration Institute (ARI)
 2. Air Movement and Control Association AMCA
 3. American National Standards Institute (ANSI)
 4. American Society of Heating, Refrigeration and Air Conditioning (ASHRAE)
 5. American Society of Mechanical Engineers (ASME).
 6. American Society of Testing and Materials (ASTM)
 7. American Welding Society, Inc. (AWS)
 8. Associated Air Balance Council (AABC)
 9. Factory Mutual System (FM)
 10. Institute of Electrical and Electronics Engineers (IEEE)
 11. Insulated Cable Engineers Association (ICEA)
 12. National Electrical Contractors Association (NECA)
 13. National Electric Manufacturers Association (NEMA)
 14. National Environmental Balancing Bureau (NEBB)
 15. Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA)
- D. Codes, laws and standards provide a basis for the minimum installation criteria acceptable. The drawings and specifications illustrate the scope required for this project, which may exceed minimum codes, laws and standards.
- E. The date of the code or standard is that in effect at the Bid date.
- F. Give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from authorities having jurisdiction. Deliver all certificates of inspection to the authorities having jurisdiction. No work shall be covered before examination and approval by the Owner's Representative, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work to conform to requirements, satisfactory to Owner's Representative, and without extra cost to the Owner. If work is covered before inspection and approval, this Contractor shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.05 GENERAL REQUIREMENTS

- A. Nameplates
1. Each item of equipment shall have a nameplate bearing the manufacturer's name, address, type or style, model number, catalog number, and serial number

securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

B. Maintenance Information

1. Systems and equipment which require periodic maintenance to maintain efficient operation shall be furnished with complete necessary maintenance information. Required routine maintenance actions, as specified by the manufacturer, shall be stated clearly and incorporated on a readily accessible label on the equipment. Such label may be limited to identifying, by title or publication number, the operation and maintenance manual for that particular model and type of product.

1.06 MATERIAL AND EQUIPMENT STANDARDS

- A. Where equipment or materials are specified with the name of a manufacturer, such specification shall be deemed to be used for the purpose of establishing a standard for that particular item. No equipment or material shall be used unless previously approved by the Owner's Representative.
- B. Substitutions (approved equals) may be offered for review provided the material, equipment or process offered for consideration is equal in every respect to that indicated or specified. In order for Requests for substitution to be considered, all must be submitted for pre-approval of manufacturer within 30 days of award of contract. All requests must be accompanied by a list of minimum 5-year-old successful installations of similar scope (with owner contact and phone number), complete specifications together with drawings or samples to properly appraise the materials, equipment or process. Allow 30 days for Owner's Representative's review.
- C. If a substitution of materials or equipment in whole or in part is made, this Contractor shall bear the cost of any changes necessitated by any other trade as a result of said substitution.
- D. All materials, equipment and accessories provided under this section shall be new and unused products of recognized manufacturers as approved.

1.07 SUBMITTALS

- A. Conform to the requirements of Division 1, General Conditions, for schedule and form of all submittals unless specifically noted otherwise in this section. Coordinate this submittal with submittals for all other finishes. Shop drawings and design layouts shall be prepared by licensed installing contractors and shall note the name(s), license number(s) and license expiration date(s) of the contractor(s) installing the heating, equipment and controls systems.
- B. Definitions:
 1. Shop Drawings are information prepared by the contractor to illustrate portions of the work in more detail than indicated in the Contract Documents.
 2. Acceptable Manufacturers: The mechanical design for each product is based on the single manufacturer listed in the schedule or shown on the drawings. In Part 2 of the specifications certain Alternate Manufacturers are listed as being acceptable. In addition, the MATERIAL AND EQUIPMENT STANDARDS paragraph potentially allows for substitutions as being acceptable. These are acceptable only if, as a minimum, they:

- a. Meet all performance criteria listed in the schedules and outlined in the specifications. For example, to be acceptable, an air handling unit must deliver equal CFM against equal external static pressure (with the allowed pressure drop of dirty filters) using equal or less horsepower as the air handler listed in the schedules.
- b. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either the space or the product. Clearances to walls, ceilings, and other equipment will be at least equal to those shown on the design drawings. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Engineer has determined that the manufacturer's products will fit within the available space – this determination is solely the responsibility of the contractor.
- c. Products must adhere to all architectural considerations including, but not limited to: being of the same color as the product scheduled or specified, fitting within the architectural enclosures and details.

C. Submittal Procedures, Format and Requirements

- 1. Review submittal packages for compliance with Contract Documents and then submit to Owner's Representative for review. Submit enough sets of shop drawings such that, after review, two sets will be kept by the reviewer, with only the remaining sets returned with reviewer's marks and comments.
- 2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
 - a. Title.
 - b. Equipment number.
 - c. Name and location of project.
 - d. Names of Owner, Engineer and Seller.
 - e. Names of manufacturers, suppliers, vendors, etc.
 - f. Date of submittal.
 - g. Whether original submittal or resubmitted.
- 3. Shop drawings showing manufacturer's product data shall contain detailed dimensional drawings (minimum $\frac{1}{4}" = 1'$ scale) including plans and sections (where physical clearance could be an issue). Provide larger scale details as necessary. Sheet metal drawings shall show elements of Architect's reflected ceiling plan, exposed ductwork, walls and partitions (highlighting fire walls and smoke partitions), diffusers, registers, grilles, all dampers (fire, smoke, balancing, backdraft, and control dampers), sleeves and other aspects of construction as necessary for coordination.
- 4. Submit accurate and complete description of materials of construction, manufacturer's published performance characteristics, sizes, weights, capacity ratings (performance data, alone, is not acceptable), electrical requirements, starting characteristics, wiring diagrams, and acoustical performance for complete assemblies. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information

necessary to demonstrate compliance with all requirements of Contract Documents.

5. Provide shop drawings showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly, this contractor shall reinstall them within the original contract price.
 - a. Alternate pipe joining methods such as grooved and permanent push-to-connect systems shall be shown on drawings and product submittals, and be specifically identified with the applicable manufacturer's style or series number. Installation shall include any additional hangers required for the alternate system.
 6. Provide complete data for all auxiliary services and utilities required by submitted equipment. This shall include power, cooling water and compressed air requirements and points of connection.
 7. Provide a complete description of all controls and instrumentation required including electrical power connection drawing for all components and interconnection wiring to starters, detailed information on starters, control diagrams, termination diagrams, and all control interfaces with a central control system.
 8. Provide installation and erection information including; lifting requirements, and any special rigging or installation requirements for all equipment.
 9. The Owner's Representative shall approve all materials before commitment for materials is made.
- D. Product Data: Submit complete manufacturer's product description and technical information including:
1. Identification
 2. Electric Motors and Starters
 3. Variable Frequency Drive (VFD) Motors
 4. Operating and maintenance instructions and manuals
 5. HVAC Control Systems
 6. Testing, Adjusting, & Balancing Qualifications, Plan, and Reports
 7. Identification, labels and tags, including database for all equipment and devices
 8. O&M manual table of contents
- E. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in an individual (combined) submittal.
1. Do not submit multiple product information in a single bound manual.
 2. Three-ring binders shall not be accepted.
- F. Deviations

1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the deviation to the attention of the Owner's Representative.
 2. Without letters flagging the deviation to the Owner's Representative, it is possible that the Engineer may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Owner's Representative, the Seller shall hold the Engineers, his consultants and the Owner harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Engineer has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.
 3. Approval of proposed deviations, if any, will be made at discretion of Engineer.
- G. Schedule: Incorporate shop drawing review period into construction schedule so that Work is not delayed. This subcontractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule: Allow at least 10 working days, exclusive of transmittal time, for review each time shop drawing is submitted or resubmitted with the exception that 20 working days, exclusive of transmittal time are required for the following:
1. HVAC temperature control submittals
 2. TAB draft and final balancing reports.
 3. As built drawings
 4. If more than five shop drawings of a single trade are received in one calendar week.
- H. Responsibility
1. Intent of Submittal review is to check for capacity, rating, and certain construction features. HVAC contractor shall ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with approved submittals to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of Contract Documents. The Engineer's noting of some errors while overlooking others will not excuse the HVAC contractor from proceeding in error and will not absolve the contractor from meeting the full design intent of the associated system(s). Contract Documents requirements are not limited, waived nor superseded in any way by review.
 2. Inform subcontractors, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.
- I. In the event that the HVAC Subcontractor fails to provide Shop Drawings for any of the products specified herein:

1. The HVAC Subcontractor shall furnish and install all materials and equipment herein specified in complete accordance with these Specifications.
 2. If the HVAC Subcontractor furnishes and installs material and/or equipment that is not in complete accordance with these Specifications, he shall be responsible for the removal of this material and/or equipment. He shall also be responsible for the replacement of this material and/or equipment with material and/or equipment that is in complete accordance with these Specifications, at the direction of the Owner's Representative.
 3. Removal and replacement of materials and/or equipment that is not in complete compliance with these Specifications shall be done at no extra cost to the Owner.
 4. Removal and replacement of materials and/or equipment that is not in complete compliance with these Specifications shall not be allowed as a basis for a claim of delay of completion of the Work.
- J. Mark dimensions and values in units to match those specified.
- K. Submit Material Safety Data Sheets (MSD) on each applicable product with submittal.

1.08 OPERATION AND MAINTENANCE DATA

- A. Commence preparation of the Operating and Maintenance (O&M) Manuals immediately upon receipt of "Approved" or "Approved as Noted" shop drawings and submit each section within one month. The final submission shall be no later than two months prior to the projected date of Substantial Completion of the Project.
- B. Submit O&M table of contents in the submittal phase. O&M manuals shall be built as submittals are accepted and shall include the individual equipment manufacturer's data retrieval sheet, as per Attachment A in Part IV for input into the Owner's Maintenance Management System. Form shall be provided and completed electronically.
- C. Each O&M document shall include the manufacturer's web address for equipment - specific O&M information for Internet access by the Owner.
- D. The manual shall consist of (3) sets of manuals and include (3) sets of CDs, which shall contain the scanned content of the entire manual. The manual shall highlight the actual equipment used and not be a master catalog of all similar products of the manufacturer. The manual shall be submitted for review prior to creation of the CDs.
- E. The Manual shall contain the following:
1. Operations Manual
 - a. Systems description including all relevant information needed for day-to-day operations and management including:
 - 1) Start-up procedures
 - 2) Shut-down procedures.
 - 3) Trouble-shooting checklist (i.e., common alarms with possible cause & effect, etc.)
 - b. Wiring diagrams, schematics, logic diagrams and sequence of operations that accurately depict the controls system.

- c. Depiction of each interface screen where programmable logic and visual displays are provided. Descriptors shall be provided to define displayed data, alarms, etc.
- d. A single sheet (for ease of removal) of all access codes and passwords necessary to access all levels of control and programming.

2. Maintenance Manual

- a. Define all maintenance activities required to ensure system operation within manufacturers specified parameters. Maintenance documentation shall include:
 - 1) Data retrieval sheet
 - 2) Special instructions (i.e., lockout/tag-out, etc.)
 - 3) Special tools (i.e., key, allen wrench, etc.)
 - 4) Tasks
 - 5) Frequency
 - 6) Required materials, lubricants, etc.
- b. Provide table of all required activities plotted vs. interval with adequate fill-in-space for "activity completion date" and "comments". Where multiple instrument readings are required, provide data sheet formatted to accommodate activity.
- c. Provide as part of each package, lubricating charts indicating equipment tag number, location, equipment service, greasing and lubricating requirements, lubricants, and intervals.
- d. Provide as part of each package, a valve and system chart that corresponds to the valve tags. Provide directions for normal positions and positions for equipment failure modes.
- e. Provide all information as listed on the Facility Support Services data sheet as per Attachment A in Part IV for input into the owner's Maintenance Management System. Form shall be provided and completed electronically.
- f. The HVAC Subcontractor shall furnish spare-parts data for each different item of equipment furnished. The data shall include a complete list of: parts and supplies, with current unit prices, lead time, and source of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment, or specified hereinafter to be furnished as part of the contract; and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 360 days at the particular installation. The foregoing shall not relieve the HVAC Subcontractor of any responsibilities under the guarantees specified herein.
- g. Provide copy of all warranty information with associated date of substantial completion (commencement of warranty) and end date of coverage. Define all components/subsystems specifically included and excluded.

- F. Provide O&M manuals for each of the following as a minimum:
 - 1. Electric Motors and Starters
 - 2. HVAC Control Systems
 - 3. Variable Frequency Drive (VFD) Motors

1.09 RECORD DRAWINGS

- A. Refer to DIVISION 1, General Conditions, for record drawings and procedures to be provided under this section, unless specifically noted otherwise in this section.
- B. Record Drawings (red-line drawings) will be updated by this Contractor daily for review with the monthly requisition. The record drawing shall be an accurate depiction of the systems as completed, including dimensions (vertical/horizontal) of concealed components off fixed building elements.
- C. The HVAC Foreman shall maintain complete and separate set of prints of Contract Drawings at job site at all times and shall record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design.
- D. At completion of work the HVAC Contractor shall prepare a complete set of record drawings on AutoCAD showing all systems as actually installed. The Architectural background AutoCAD files will be made available for the contractor's copying, at his expense, to serve as backgrounds for the drawings. The HVAC Contractor shall transfer changes from field drawings onto AutoCAD drawings and submit copy of files and three sets of prints to Owner's Representative for comments as to compliance with this section. CADD layering as established by the A & E design team shall be maintained with any and all changes done by the contractor.
- E. The Architect and Engineer are not granting to the Contractor any ownership or property interest in the CADD Drawings by the delivery of the CADD Disks to the Contractor. The Contractor's rights to use the CADD disks and the CADD Drawings are limited to use for the sole purpose of assisting in the Contractor's performance of its contractual obligations under its contract with respect to the Project. The Architect and Engineer are granting no further rights. Any reuse or other use by the Contractor will be at the Contractor's sole risk and without liability to the Architect and Engineer. The Contractor hereby waives and releases any losses, claims, damages, liabilities of any nature whatsoever, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor. The Contractor, to the maximum extent permitted by law, hereby agrees to indemnify, defend and hold the Architect and Engineer harmless from all losses, claims, damages, liabilities, and costs (including attorney fees) arising out of, resulting from, or otherwise related to the use of the CADD Disks and CADD Drawings by the Contractor.
- F. Record Drawings, shall show "as-built" condition of all plans, details, sections, piping diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer model numbers and capacities of final installed equipment.
- G. The HVAC Contractor shall submit the record set for approval a minimum of three weeks prior to seeking the permanent certificate of occupancy.

1.10 WARRANTIES

- A. Submit manufacturer's standard replacement warranties for material and equipment furnished under this Section. Such warranties shall be in addition to and not in lieu of all liabilities which the manufacturer and the HVAC Subcontractor may have by law or by provisions of the Contract Documents.
- B. All materials, equipment and work furnished under this Section shall be guaranteed against all defects in materials and workmanship for a minimum period of one year commencing with the Date of Substantial Completion. Where individual equipment sections specify longer warranties, provide the longer warranty. Any failure due to defective material, equipment or workmanship which may develop, shall be corrected at no expense to the Owner including all damage to areas, materials and other systems resulting from such failures.
- C. Guarantee that all elements of each system meet the specified performance requirements as set forth herein or as indicated on the Drawings.
- D. Upon receipt of notice from the Owner of the failure of any part of the systems during the guarantee period, the affected parts shall be replaced. Any equipment requiring excessive service shall be considered defective and shall be replaced.

1.11 COORDINATION

- A. Refer to DIVISION 1, General Conditions, for record drawings and procedures to be provided under this section, unless specifically noted otherwise in this section.
- B. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as required.
- C. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other Sections. Any conflicts shall be referred immediately to the Owner's Representative for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Owner's Representative's satisfaction at no expense to the Owner.
- D. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section may interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. Prepare and submit for approval 3/8" scale or larger working drawings and sections, clearly showing how the work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.
- E. Keep fully informed as to the shape, size and position of all openings required for all apparatus, piping, ductwork, etc., and give information in advance to build openings into the work. Furnish all sleeves, pockets, supports and incidentals, and coordinate with the Owner's Representative for the proper setting of same.
- F. All distribution systems which require pitch or slope such as condensate drains and water piping shall have the right of way over those which do not.
- G. Make reasonable modifications in the work as required by structural interferences, interference with work of other trades, or for proper execution of the work without extra charge.

- H. Keep fully informed as to the size, shape and location of all openings required for the work of this Section and give full information to all Subcontractors and the Owner's Representative.

1.12 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. It is the intention of the Specifications and Drawings to call for complete, finished work, tested and ready for continuous operation. Any apparatus, appliance, material or work not shown on the Drawings, but mentioned in the Specifications or vice versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be provided by the HVAC Subcontractor or his/her Sub-subcontractors, without additional expense to the Owner.
- B. The Drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the site and shall have the approval of the Architect before being installed. The HVAC Subcontractor shall follow Drawings, including shop drawings, in laying out work and shall check the Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Architect before proceeding with the installation. The HVAC Subcontractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- C. Any requests for information (RFI) for resolving an apparent conflict or unclarity, or a request for additional detail, shall include a sketch or equivalent description of contractors proposed solution.
- D. Sizes of ducts and pipes and routing are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the intent and purpose of the Drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge.

1.13 INSPECTION OF SITE CONDITIONS

- A. Prior to submission of bid, visit the site and review the related construction documents to determine the conditions under which the Work has to be performed. Send a report, in writing, to the Owner's Representative, noting any conditions which might adversely affect the Work of this Section of the Specifications.

1.14 SURVEY AND MEASUREMENTS

- A. Base all required measurements, horizontal and vertical, from referenced points established with the Owner's Representative and be responsible for correctly laying out the Work required under this Section of the Specification.
- B. In the event of discrepancy between actual measurements and those indicated, notify the Owner's Representative in writing and do not proceed with the related work until instructions have been issued.

1.15 DELIVERY, STORAGE AND HANDLING

- A. No materials shall be delivered or stored on site until Shop Drawings have been approved.
- B. All manufactured materials shall delivered to the site in original packages or containers bearing the manufacturer's labels and product identification.

- C. Protect materials against dampness. Store off floors, under cover, and adequately protected from damage.
- D. Inspect all equipment and materials, upon receipt at the job site, for damage and conformance to approved shop drawings.

1.16 PROTECTION OF WORK AND PROPERTY

- A. This Contractor shall be responsible for the care and protection of all work included under this Section until the completion and final acceptance of this Contract.
- B. Protect all equipment and materials from damage from all causes including, but not limited to, fire, vandalism and theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal material or equipment at no additional cost to the Owner.
- C. Protect all equipment, outlets and openings with temporary plugs, caps and covers. Protect work and materials of other trades from damage that might be caused by work or workmen under this Section and make good damage thus caused.
- D. Damaged materials are to be removed from the site; no site storage of damaged materials will be allowed.

1.17 SUPERVISION

- A. Provide a competent Supervisor with a minimum of 5 years of experience in HVAC Construction Supervision who shall be in charge of the HVAC work at the site.

1.18 SAFETY PRECAUTIONS

- A. Life safety and accident prevention shall be a primary consideration. Comply with all of the safety requirements of the owner and OSHA throughout the entire construction period of the project.
- B. Furnish, place and maintain proper guards and any other necessary construction required to secure safety of life and property.

1.19 SCHEDULE

- A. Construct work in sequence under provisions of Division 1 and as coordinated with the Owner's Representative.

1.20 CUTTING AND PATCHING

- A. Provide all cutting and patching necessary for the proper installation of work to be performed under this Section.
- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. Fit around, close up, repair, patch, and point around the work specified herein to match the existing adjacent surfaces and to the satisfaction of the Owner's Representative.
- D. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment that is part of this Section of the Specifications.

- E. All of this work shall be carefully done by workmen qualified to do such work and with the proper and smallest tools applicable.
- F. Any cost caused by defective or ill-timed work required by this Section of the specifications shall be borne by the Subcontractor.
- G. When, in order to accommodate the work required under this Section of the specifications, finished materials of other trades must be cut or fitted, furnish the necessary drawings and information to the trades whose materials must be cut or fitted.

1.21 ACCESSIBILITY

- A. All work provided under this Section of the Specification shall be installed so that parts requiring periodic inspection, maintenance and repair are readily accessible. Work of this trade shall not infringe upon clearances required by equipment of other trades, especially code required clearances to electrical gear. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Owner's Representative.

1.22 ELECTRICAL WORK

- A. All electrical apparatus and controls furnished, and the installation thereof, as a part of the HVAC work, equipment, and controls shall conform to applicable requirements under DIVISION 16 - ELECTRICAL.

1.23 PROJECT CLOSEOUT

- A. Certificates Of Approval
 - 1. Upon completion of all work, provide certificates of inspections from the following equipment manufacturers stating that the authorized factory representatives have inspected and tested the operation of their respective equipment and found the equipment to be in satisfactory operating condition and installed per the manufacturers installation instructions and requirements.
 - a. Variable Speed Drives
 - b. Automatic Temperature Controls
- B. Construction Observations By The Engineer
 - 1. The engineer is contracted to make one progress site visits during construction, **one** substantial completion (punch list) site visit for determining substantial completion and **one** Final inspection visit to determine if all work is complete.
 - 2. The Sub Contractor and the General Contractor are required to inspect their own work and make any corrections to the work to comply with the specifications and the contract documents. It is not the responsibility of the engineer to develop lists of incomplete work items.
 - 3. Progress Site Visits
 - a. The purpose of the progress site visit by the engineer is to observe if the work is proceeding in accordance with the contract documents.
 - b. The engineer will prepare a field report which will note in general the work completed since the last observation visit, work found not to be in

accordance with the contract documents and work not corrected since the previous observation visit.

C. Substantial Completion

1. When the Subcontractor considers the Work under this Section is substantially complete, the subcontractor shall submit written notice, through the General Contractor, with a detailed list of items remaining to be completed or corrected and a schedule of when each remaining work item will be completed. Should the engineer determine the list of remaining work does not constitute substantial completion the engineer will notify the Architect and/or Owner and he will not make a substantial completion site visit.
2. The following items shall be submitted and approved by the Engineer prior to the written request for substantial completion inspection:
 - a. Certification of successful operation of all systems.
 - b. Training of the owner's personnel in the operation of the systems.
 - c. Record Drawings in accordance with the contract specifications.
 - d. Operation and Maintenance manuals.
 - e. Testing reports.
 - f. Balancing reports.
 - g. Manufacturers certificates of approvals.
 - h. Emergency contact list for reporting of malfunctioning equipment during the warrantee period.
 - i. Contractors Project Completion certificate in accordance with the building code requirements.
3. Should the Engineer, during the substantial completion visit, observe that the Work is substantially complete, s/he will provide a written listing of the observed deficiencies referred herein as the Punch List. The Punch List will provide for a place for the subcontractor and general contractor to sign off and date each item individually indicating that the observed deficiency item has been corrected.
4. Should the Engineer, during the substantial completion site visit, observe that the Work is not substantially complete, s/he will provide, a written list of the major deficiencies and a reason for the work not being considered substantially complete.
5. If the work is found not to be substantially complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the Subcontractor through the contractual agreement for any further observations by the engineer.
6. The Subcontractor shall remedy all deficiencies listed in the punch list within the time frame required by the contract.

D. Engineers Construction Completion Certification

1. Where required by the applicable code, the Engineers Construction Completion Certification will be issued by RDK Engineers when all life safety and health related issues are complete, all required functional tests are complete and all reports are complete. The following is a minimum listing of the required systems to be tested with reports generated indicating they are complete and ready for use:
 - a. Variable Speed Drive Manufacturers Certification Tests
2. There shall be NO outstanding items identified on the punch list for scope within any of these categories.

E. Final Completion

1. The following items shall be submitted prior to the written request for Final completion:
 - a. Revised Substantial Completion items to be resubmitted in accordance with the review process comments.
 - b. Warranties commencing the date of Substantial completion
 - c. Individual Signed and dated Punch List acknowledging completion of all punch list items
2. When the Subcontractor considers all of the punch list work items complete, the subcontractor shall submit written notice through the General Contractor that all Punch List items are complete and resolved and the work is ready for final inspection. The signature lines for completion of each punch list item shall be signed by the Subcontractor indicating the work is complete and signed by the General contractor indicating s/he has inspected the work and found it to be complete. Should the Engineer find the work to be finally complete and all Punch List items are complete the Engineer will make a recommendation to the Architect or Owner. If the Engineer has found the punch list work to be incomplete during final inspection a written listing of the observed deficiencies will be prepared by the Engineer.
3. If the work is not fully complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the subcontractor through the contractual agreement for any reobservations by the engineer.

F. Re-observation Fees

1. The re-observation fee shall be \$1200.00 per visit.

G. Subcontractor's Project Completion Certificate

1. Upon completion of work and prior to request for Certificate of Occupancy, the Subcontractor shall issue a certificate stating that work has been installed generally consistent with construction documents and all applicable codes. RDK Engineers can furnish a blank contractor's certificate form upon request. The certificate shall certify:
 - a. Execution of all work has been installed in accordance with the approved construction documents.

- b. Execution and control of all methods of construction was in a safe and satisfactory manner in accordance with all applicable local, state and federal statutes and regulations.
- 2. The certificate shall include the following information:
 - a. Project.
 - b. Permit Number.
 - c. Location.
 - d. Construction Documents.
 - e. Date on Plans and Specifications submitted for approval and issuance of the Building Permit.
 - f. Addendum(a) and Revision Dates.
- 3. The certificate shall be signed by the Subcontractor and include the following:
 - a. Signature.
 - b. Date.
 - c. Company.
 - d. License Number.
 - e. License Expiration Date.

PART 2 - PRODUCTS

2.00 MOTORS, DRIVES AND STARTERS

- A. All equipment shall be provided complete with motors and drives, unless otherwise indicated.
- B. Motors shall be Premium Efficiency (as available by size/speed/horsepower) and shall conform to NEMA Standards and shall be suitable for load, duty service and location. Motors shall have nameplates giving manufacturer's name, serial number, horsepower, efficiency, speed and current characteristics. Motors shall be General Electric, Westinghouse, Reliance, Allis-Chalmers, Gould, Baldor, or approved equal.
- C. Motors shall be tested in accordance with the standards of ANSI C50 and conform therewith for insulation resistance and electric strength. Minimum efficiency levels shall be as listed in latest edition of ANSI/ASHRAE Standard 90.1 or the state's energy code, whichever is higher. All motors shall be tested in accordance with IEEE Standard 112, Test Method B.
- D. Motors for use with variable frequency drives (VFD) shall be inverter duty rated and labeled, meet NEMA MG-1, and have a minimum Class F insulation. Bearing grease shall be non-conductive, provide on nameplate the type of grease to use.
- E. Motors ½ HP and larger shall be squirrel cage induction, ball or roller bearings with pressure grease lubrication, specifically wound for the scheduled voltages.

- F. Motors less than ½ HP shall be capacitor start of split phase type, specifically wound for 120V/1PH/60HZ alternating current, unless otherwise noted. Fractional horsepower motors, integral to equipment intended for installation in finished public spaces, shall be provided with an overload device responsive to motor current. The device shall be integral to the motor or separate as part of the controls.
- G. 208/480 volt 20 HP and larger motors shall be variable speed. 480 volt motors shall be variable speed. Coordinate motor with starter type.
- H. Motors shall be furnished complete with conduit terminal box of size adequate to accommodate conduits and wires as sized on the Electrical Drawings or specified under this Section.
- I. Motor capacity shall be sufficient to operate associated driven devices under conditions of operation and load and with overload and at least the horsepower indicated or specified. All motors shall be of the premium efficiency, high power factor, low energy consuming type most suitable for the application and installed environment. Any motor replacement necessary for compliance to the application shall be at no additional cost to the Owner.
- J. Motors shall be suitable for continuous duty at rated horsepower with temperature rise not to exceed 40°C for drip proof motors, 50°C for splash proof motors, 55°C for totally enclosed or explosion proof motors. All non-VFD motors shall be capable of 15% overload without overheating and suitable for operation for the ambient conditions of its specific location.
- K. Direct connected motors shall be furnished with adjustable base. Motors connected to driven equipment by belt or shaft shall be furnished with adjustable sliding bases, except fractional HP motors, which shall have slotted mounting holes.
- L. Drives for belted motors shall be as manufactured by Dodge Manufacturing Company, Browning Manufacturing Company, T.B. Woods Company or equal with adjustable motor sheaves and adjustable slide bases. The drive belts shall be as short as practicable. All fans and fan units shall be furnished with cogged-type triple V-belt drives, each sized for 150% of the design drive capacity. All multiple belt drives shall have matched sets of belts.
- M. Where starters or variable speed drives are not integral with packaged equipment specified in this section, the Electrical Subcontractor shall furnish all starters and drives in accordance with Division 16 drawings and specifications.
- N. For packaged equipment, motor controllers shall be equipped with all poles, auxiliary contacts and other devices necessary to permit the interlocking and control sequences required. Controller operating coils shall be generally designed for 120 volt operation, and 3 phase motors shall be provided with thermal overload protection in all phases.
- O. All electrical apparatus furnished under this Section shall be approved by UL (or other agencies approved by the authority having jurisdiction) and shall be labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.

2.01 AUTOMATIC TEMPERATURE CONTROLS

- A. Automatic Temperature Controls shall be as specified in Section 15900 BUILDING AUTOMATION SYSTEM, which is hereby made a part of this specification section.

2.02 VARIABLE SPEED DRIVES

A. Reference Standards and Acceptable Manufacturers

1. The variable speed drives (VSDs or VFDs) with all options shall be UL and ETL Listed as a complete assembly and shall be built in compliance with the latest standards of ANSI, IEEE, NEMA and the National Electric Code.
2. Acceptable manufacturers, provided they meet the other requirements of this specification shall be Allen Bradley, ABB, Siemens, Yaskawa, GE or approved equal.

B. Construction

1. The VSD shall be of the Pulse Width Modulated design converting the fixed utility voltage and frequency to a variable voltage and frequency output with 6-pulse IGBT bridge. Efficiency shall exceed 95% at 100% speed and load. Line side displacement power factor shall exceed (0.95) regardless of speed and load.
2. The VSD shall be housed in a NEMA 1 metal enclosure.
3. Standard operating conditions shall be:
 - a. Incoming three phase 460 volt AC power $\pm 10\%$, 60 Hz.
 - b. Humidity 0 to 95% (noncondensing and noncorrosive).
 - c. Altitude 0 to 0 to 3,000 feet above sea level, without derating.
 - d. Ambient temperature 0 to 40°C.
4. VSDs shall include the following system interfaces:
 - a. Process control speed reference interface to receive an isolated 0-10 volts DC or 4-20 MA DC signal.
 - b. Run relay with an isolated set of Form C contacts.
 - c. Dedicated terminal blocks for interface with remote start contact and remote safety trips.
 - d. 120 volt control to allow VSD to interface with remote contacts at a distance up to 500 feet and with three-wire control.
 - e. The Mechanical Contractor shall be responsible for all control wiring between the terminal strip (and contacts) provided with the VSD, and the automatic temperature control system. Mechanical contractor shall also be responsible for ensuring that the control output signal (4-20 Ma, 1-10 VDC, etc.) from the DDC system is compatible with the input signal required by the drive.
5. The VSD shall include the following protective features:
 - a. Door interlocked padlockable disconnect switch.
 - b. Electronic instantaneous overcurrent protection.
 - c. Undervoltage protection.
 - d. DC bus overvoltage protection.

- e. Able to withstand output line-to-line short circuits without component failure.
 - f. Surge protection from AC line transients.
 - g. Individual visible status indication of the following protective functions:
 - 1) Logic Error
 - 2) Undervoltage
 - 3) Overcurrent
 - 4) DC Bus Overvoltage
 - 5) Controller Overtemperature
 - 6) Overfrequency
 - 7) Phase Loss.

A single flashing light to indicate a VSD trip is not acceptable.
 - h. A dry contact output to indicate protective trip-out (open on trip).
 - i. Provide electronic motor overload protection to protect motor and drive at all frequencies. Electronic overload circuits, which protect motor only at full speed, shall not be acceptable. VSD shall sense load and recalibrate thermal trip curve to insure low speed motor protection.
 - j. Overload capability shall be 110% of the motor FLA based on the NEC ratings for 60 seconds.
 - k. Opening of an output disconnect under load will not result in component damage.
 - l. VSD shall not require restoring after failure of source voltage. VSD shall automatically restart unit upon restoration of source voltage if start signal is available.
6. The VSD shall include the following additional features:
- a. Output contactor to provide electrical output isolation when the VSD is not running.
 - b. Individual 0-10V or 4-20 mA analog output to frequency and kW.
 - c. Provide the following in the same enclosure as the variable speed drive:
 - 1) Bypass controller – manual transfer to line power via contactors; including motor thermal overload and fuse protection while in bypass capability.
 - 2) Isolating switch – service switch that provides the ability to service the controller (electrically isolated) while in bypass operation without having to remove power to the motor.
 - d. Critical frequency avoidance circuit to avoid operation at speeds which cause excessive vibration in the driven equipment. Option board to have at least two field adjustable bands.

- e. Adjustable current/torque limit (50-110%) which limits current by lowering the output frequency when excessive current is drawn.
 - f. Multiple attempt restart, which will perform three, restarts in 10 minutes for all VSD internal trips.
 - g. AC ammeter.
 - h. The variable speed drive shall be capable of starting from power interruption into spinning load without stopping motor or creating fault condition. VSD shall speed search motor RPM and synchronize phase rotation to return motor to set speed. All the drives control programming, including all setpoints, shall be maintained during a power interruption.
 - i. VSD shall not cog at frequencies greater than 6 Hz. Drive manufacturer shall include a statement to this effect with his submittal. Drive manufacturer shall be fully liable for any damage to pump couplings or other HVAC equipment caused by low frequency clogging.
 - j. VSD manufacturer shall provide 3% chokes, based on motor horsepower, for each VSD provided. These chokes shall be designed for use with the VSD to smooth current waveforms and lower harmonic disturbance.
7. Standard adjustments shall include minimum speed (5 to 25% of maximum RPM), maximum speed (80 to 100% of maximum RPM), acceleration time (1-3600 seconds), deceleration time (1-3600 seconds), dwell time, voltage boost, and volts/hertz.
8. Door Mounted Operator Controls and status indication shall include:
- a. VSD shall have a digital display, keypad and customer connections; regardless of horsepower rating. The keypad is to be used for local control (start/stop, forward/reverse, and speed adjust) for setting all parameters, and for stepping through the displays and menus.
 - b. The digital display shall be in plain English digital display (code numbers are not acceptable), a 40-character (2 line 16 characters/kine) backlite LCD display. All set up parameters, indications, faults, warnings and other information must be displayed in words to allow the user to understand what is being displayed without the use of a manual or cross reference table. The display must be able to be read without opening cabinet.
 - c. Pre-wired three position Hand-Off-Auto switch and speed potentiometer located on exterior side of motor control center door. In the "Hand" position, the VSD will be started and the speed will be controlled from the speed potentiometer or through a direct keypad command. In the "Off" position the VSD will be stopped in the "Auto" position, the VSD will start via an external contact closure and its speed will be controlled via an external speed reference.
 - d. The VSD shall have a manual speed potentiometer in addition to using the keypad as a means of controlling speed manually.
 - e. By-pass/auto/manual speed control selection
 - f. Manual speed adjustment

- g. Frequency meter
- h. Elapsed time meter
- i. Power on indication
- j. Run indication
- k. Power (kW) meter

PART 3 - EXECUTION

3.00 DEMOLITION

- A. The existing facility will continue to operate during all phases of the demolition work and subsequent construction. No interruption of the systems will be permitted without prior approval of the Owner's Representative.
- B. Submit proposed methods and sequence of operations for the selective demolition work to the Owner's Representative for review prior to the start of the work.
- C. Perform all demolition while ensuring minimum interference with adjacent occupied areas.
- D. Where sections of a system are to be removed and the system serves other areas of the building that are outside the scope of the work, perform the following:
 - 1. Coordinate the temporary shut down of the system with the Owner's representative.
 - 2. Install supports in the remaining active sections of the system as required by the removal of nearby supports associated with the demolition.
 - 3. Isolate the system.
 - 4. Cap the remaining system section, leaving the remainder of the system active.
- E. Provide temporary shoring or bracing during the demolition work to prevent movement, settlement, or collapse of the system or adjacent systems due to the work.
- F. Promptly repair any damage caused to adjacent facilities or areas that are designated to remain at no additional cost to the Owner.
- G. Equipment:
 - 1. Coordinate with the Contractor and Subcontractors to provide disconnection prior to equipment removal.
 - 2. Remove equipment by unfastening at the supports or attachments. Then remove the attachments from the building, leaving no component of the original installation.
 - 3. The Owner shall choose to take possession of the equipment or not. If the Owner chooses not to take possession of the equipment, the Subcontractor shall remove the equipment and dispose of the equipment in accordance with Paragraph H specified below.
 - 4. Exercise care with equipment that is to be relocated or turned over to the Owner, examine the equipment before removal in the presence of the Owner's

representative to determine its condition. Make a record of any marks, etc. by a photograph or videotape acknowledged by the Owner's representative.

5. Install relocated equipment to ensure no damage.
 6. Equipment to be turned over to the Owner: Deliver to an on-site location designated by the Owner, and obtain acknowledgment of receipt in good condition.
- H. All equipment, etc., not turned over to the Owner shall be put into the General Contractor's dumpsters; become the property of the General Contractor, and shall be removed from the site by the General Contractor. For equipment containing any refrigerant, it shall be reclaimed for recycling. Any hazardous materials such as mercury from thermometers or thermostats; ethylene glycol; or lead shall be properly disposed of, following EPA guidelines.

3.01 GENERAL

- A. Install all items specified under PART 2 - PRODUCTS, according to the manufacturer's requirements and best quality recommendations, shop drawings, the details as shown on the Drawings and as specified in this specification section.
- B. Install all work so that parts requiring inspection, replacements, maintenance and repair shall be readily accessible. Minor deviations from the Drawings may be made to accomplish this, but any substantial change shall not be made without prior written approval from the Owner.
- C. Equipment bases mounted on concrete slabs and pads, or mounted on stands, gratings, platforms, or other, shall not be set in any manner, except on the finished and permanent support.
- D. Support of equipment on studs or other means, and the placing or building of the supporting slab, pad, pier, stand, grating, or other "to the equipment", is prohibited.
- E. Concrete supporting structures shall have been constructed and cured a minimum of 14 days before equipment is mounted.
- F. All welding done under this section shall be performed by experienced welders in a neat and workmanlike manner. All welding done on piping, pressure vessels and structural steel under this Section shall be performed only by persons who are currently qualified in accordance with ANSI Code B31.9 (or B31.1 for steam boiler piping over 15 psig and all steam and condensate piping over 150 psig) for Pressure Piping and certified by the AWS, ASME or an approved independent testing laboratory, and each such welder shall present certificate attesting his/her qualifications to the Architect's representative whenever requested to do so on the job.
- G. All pipe welding shall be oxyacetylene or electric arc. High test welding rods suitable for the material to be welded shall be used throughout. All special fittings shall be carefully laid out and joints shall accurately match intersections. Care shall be exercised to prevent the occurrence of protruded weld metal into the pipe. All welds shall be of sound metal free from laps, cold shots, gas pockets, oxide inclusions and similar defects.
- H. All necessary precautions shall be taken to prevent fire or damage occurring as the result of welding operations.
- I. Care shall be taken when working on the roof. Protect the roof from damage.

3.02 IDENTIFICATION

A. General

1. All panels and drives furnished and/or installed under this Section of the Specifications shall be marked for ease of identification.
2. Equipment, panel, and valve labels shall be 4" by 2½" and designed to withstand temperatures of -22°F to +392°F. Labels are designed to be resistant to water, acid/solvent, dirt and oil repellent. Labels shall be high tensile Graphioplast® tearing strength as well as scratch resistant and affixed to equipment by cable ties or adhesive clear pouch. Location of label shall be at unit control panel, next to factory nameplate, lower right-hand corner of panel, and/or tie wrapped to localize disconnect at unit. Installation instructions shall be provided with the labels to assure durability (i.e., clean surface prior to adhering adhesive label, leave cable ties loose on outside of equipment to allow freedom of movement due to the elements, etc.) and with adhesive tags not secured when temperatures are below 45°F ambient temperature. Outside equipment shall have two bar code labels. One on the exterior and one inside the unit in a safe location.
3. Samples of stickers together with color schedules shall be submitted during the submittal phase of this project.
4. Marking shall be done using self-adhering (screw or rivets for equipment) labels applied to clean, smooth surfaces. All lettering shall have sharply contrasting background for ease of identification. Colors shall be in accordance with ANSI A13.1 Standards. Samples of stickers together with color schedules shall be submitted for approval.

B. Equipment Identification (by Unit Manufacturer)

1. Equipment marking shall be prominently located and securely attached with screws or rivets (no adhesives or cements are permitted) on the normally visible side of the equipment.
2. Equipment identification designations shall be taken from equipment callouts as shown on drawings and coordinated with the Owner's facility group to assure designations match up with Owner's maintenance management system identification database.
3. Provide on the label (or on a prominently located second label) all required routine maintenance action (per manufacturer). Label may be limited to identifying, by title or publication number, the operation and maintenance manual for that particular model and type of product.

C. Control Panel and Field Device Identification

1. This contractor shall furnish and install bar coded tags for all control panels and control field devices (coordinate with controls contractor for info) using a 4-inch by 2½-inch bar coded label/tag. For outdoor panels, provide two labels for each panel, one located on the exterior and one located inside the panel. Each label/tag shall have its appropriate bar code (Code 39 Standard) directly below the panel or field device name. Label shall include panel or device manufacturer, model number, serial number, and manufacturer's web site.

3.03 CONNECTIONS TO EQUIPMENT

- A. Supply and return connections shall be provided by the Contractor unless otherwise indicated. Valves and traps shall be installed in accordance with the manufacturer's recommendations. Unless otherwise indicated, the size of the supply and return pipes to each piece of equipment shall be not smaller than the connections on the equipment. No bushed connections shall be permitted. Change in sizes shall be made with reducers or increasers only.

3.04 AIR SYSTEMS BALANCING

A. General Requirements

- 1. The Contractor shall select AABC MN-1, NEBB-01, SMACNA-07 or ASHRAE 111 as the standard for providing testing, adjusting and balancing (TAB) of air systems. The selected standard shall be used throughout the project. Testing, adjusting, and balancing shall be accomplished by a firm certified for testing and balancing by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).
- B. Prior to testing, adjusting, and balancing, the Contractor shall verify that the systems have been installed and are operating as specified. Approved detail drawings and all other data required for each system and/or component to be tested shall be attached to system flow diagram documentation.
- C. The Contractor shall verify that all balancing devices required during the field coordination phase and confirm during the construction phase that they are properly installed to permit testing, adjusting and balancing and that all duct leakage tests have been completed prior to testing, adjusting and balancing. The Owner's Representative shall be notified in writing of all equipment, components, or balancing devices, that are damaged, incorrectly installed, or missing, as well as any design deficiencies that will prevent proper testing, adjusting, and balancing. Testing, adjusting, and balancing shall not commence until approved by the Owner's Representative. Instrumentation accuracy shall be in accordance with the standard selected in this paragraph.
 - 1. The HVAC Subcontractor as a part of his contract shall provide all materials, labor and service of all subcontractors for fulfillment of air and water balancing of all systems. The TAB Sub-subcontractor shall inform the HVAC Subcontractor of all requirements ahead of time.
 - 2. Provide additional sheaves and belts required to reach design CFM levels.
 - 3. The procedures used for air, hydronic and temperature balancing shall be in conformance with the "Procedural Standards for Testing, Adjusting, Balancing of Environmental System", seventh (2005) edition published by the National Environmental Balancing Bureau or the "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems", fifth edition published by the Associated Air Balance Council.
 - 4. A copy of the standards must be maintained on site by the Balancing Subcontractor at all times. The test report forms shall comply with the formats listed in these standards.
- D. Recording of Existing Airflows
 - 1. Prior to demolition, take and submit flow readings at all existing diffusers (and volume damper positions), volume boxes and air handlers as shown on drawings. After new work is completed and balanced, rebalance the existing

diffusers to their new or original airflows (as shown). Adjust existing volume boxes and air handlers as necessary to accommodate new and existing layout.

E. Instrument Accuracy Requirements

1. All instrumentation shall be checked for accuracy before beginning testing, adjusting and balancing procedures. Instrument accuracy shall be in accordance with the standard selected in paragraph A. General Requirements, immediately above. Checks may be carried out against similar equipment maintained specifically for checking purposes or by the manufacturer or a recognized testing facility. All instrumentation used for testing shall be calibrated within 6 months of use. Pitot tubes and U-tube manometers do not require checking. In no case shall the instrumentation accuracy be less than specified by the instrument manufacturer. Any instrument falling out of calibration during the process of balancing and testing shall be recalibrated or removed from the site and replaced by a properly calibrated instrument. No instruments shall be allowed to remain on-site that are not in calibration.

F. Integral with the TAB standard followed, the TAB contractor shall submit in the submittal phase the following documents:

1. Qualification data shall be submitted, 60 days prior to testing and balancing operations. The test and balance firm shall be certified by the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB). The lead balancing technician shall be qualified by AABC or NEBB and his qualification data shall include past experience on at least five similar projects. Provide proof of certification
2. TAB Plan and preliminary timeline.
3. Individual system one-line flow diagrams with pertinent data (i.e., static pressure, velocities, CFM, GPM, etc.) indicated on the applicable flow diagram for all components. Diagrams shall be made for each individual air and hydronic system.
4. Six (6) copies of a preliminary TAB report, 30 days before balancing commences. The report shall be organized by specific systems and shall clearly identify each item of equipment to be tested, adjusted, and balanced. The appropriate test procedures and measurements to be taken for each item of equipment shall be listed. Instrument calibration records shall be provided on forms shown in AABC MN-1 or SMACNA-07. Manufacturer's specified accuracy shall be shown. The report shall include floor plan drawings showing all dimensions of ductwork, piping and their related measurement locations and types of measurements to be made. All related data necessary for testing, balancing, and adjusting, including fan and pump curves, actual and nameplate speeds, voltage and amp draw (each leg) shall be included. A system readiness checklist, similar to that shown in SMACNA-07, shall be included. The report shall contain a listing of the deficiencies of all systems to be tested, adjusted and balanced and the corrective action taken. The report shall contain a schedule for the final testing and balancing.
5. Six 6 copies of the final TAB report on forms shown in AABC MN-1 or SMACNA-07, within 2 weeks after completion of the test and balance operation. Data shall be in a hard bound cover identifying the project name, location, date of submittal, name of Contractor, and a general title indicating the specific area and type of work, and shall be signed by a registered professional engineer, employed by the test and balance firm, who has a minimum of 2 years experience in testing,

adjusting and balancing work. The final report shall include a summary of the preliminary report describing test methods, test results, and major corrective actions taken. The report shall include as-tested floor plans showing all measurement locations and types of measurements made. The air handling unit data shall include a static pressure profile diagram, and pitot tube traverses where possible. The VAV terminal data shall include maximum and minimum air flows, for design and actual conditions, and shall be supported with summaries which show the air outlet totals for each VAV terminal and the VAV terminal totals for each air handling unit. Air distribution data shall include coded drawings which show the exact location of each air outlet. Pump data shall include pump efficiency. Data for chillers, heating and cooling coils, and heat exchangers, shall include heat balance calculations.

6. All instruments that are recalibrated and brought back onto the jobsite after being found to be out of calibration shall have recalibration records submitted on forms shown in AABC MN-1 or SMACNA-07.
- G. The facility shall be essentially complete with final ceiling, walls, windows, doors and partitions in place. Doors and windows surrounding each area to be balanced shall be closed during testing and balancing operations. Air systems shall be complete and operable with balancing dampers, ducting, diffusers, returns, flow control boxes and control components in place. Exhaust fans and any hoods shall be operational. Hydronic systems shall be complete and operable with balancing valves, flow meters, coils, pumps, piping and control components in place. All measurements and adjustments shall be made using procedures described in standard selected in paragraph GENERAL REQUIREMENTS. Air motion and distribution from air terminals shall be as shown. All data including deficiencies encountered and corrective action taken shall be recorded. If a system cannot be adjusted to meet the design requirements, the Contractor shall promptly notify the Owner's Representative in writing.
- H. Air Systems: Each system shall be adjusted until all flow quantities (supply, return, exhaust/relief, and outdoor air) are within plus 10% and minus 5%. Dampers shall be checked for tight shutoff. Air leakage around dampers shall be verified. Fans shall be checked for correct direction of rotation and proper speed shall be verified.
 1. General Balancing Methods: In addition to the requirements for specific systems, flows in supply, exhaust and return air systems shall be balanced using the methods in standard selected in paragraph GENERAL REQUIREMENTS. Throttling losses shall be limited. Air flow adjustments shall be made by first adjusting the fan speed to meet the design flow conditions. Fan speed adjustment may not be required for fan motors which are less than 746 W, (one horsepower,) or if throttling results in no greater than an additional 5% of the kw draw above that required if the fan speed were adjusted. If the excess draw causes the motor to enter its service factor, fan speed shall be reduced accordingly. Flows and pressures shall be checked in all main risers and supply ducts at all supply, exhaust and return fan discharges. All flows shall be recorded before and after each adjustment.
 2. Specific Systems All special or additional procedures for testing and balancing shall be in accordance with the applicable requirements of the standard selected in paragraph GENERAL REQUIREMENTS.
 - a. If a system has diversity (variable flow), only the required quantity of balanced terminals shall be opened to meet the design air flow. For terminal boxes/valves, readings shall include minimum, maximum, and heating primary air flows. Fan powered terminal units shall include the previously listed primary air flows and the fan air flow.

- I. Marking of Setting: Following final acceptance of certified reports by the Owner's Representative, the setting of all HVAC adjustment devices including valves, splitters, and dampers shall be permanently marked by the testing and balancing engineer so that adjustment can be restored if disturbed at any time.
- J. Marking of Test Ports: The testing and balancing engineer shall permanently and legibly mark and identify the location points of the duct test ports. If the ductwork has exterior insulation, these markings shall be made on the exterior side of the ductwork insulation. All penetrations through ductwork and ductwork insulation shall be properly sealed to prevent air leakage or loss of vapor barrier.
- K. Control Systems: Testing, adjusting, and balancing of the systems shall be coordinated with the control system installation. Work with the control contractor for all balancing items shown on the control sequences such as optimized setpoints for remote differential pressure sensors/transmitters (DPT) used for control of VFD's. Setpoint for DPT's shall be optimized to the lowest pressure required to provide design flow to all downstream terminal units with at least one unit's balancing device between 95% - 100% open on any of the terminal units on the pumping system. All control components shall be verified to be properly installed and operating as specified before proceeding with testing, adjusting, and balancing. Verification shall be in accordance with AABC MN-1.
 - 1. Adjustment of the temperature controls shall be coordinated by the person in charge of the balancing and adjusting and shall be performed coincidental therewith. In conjunction with the Controls contractor simulate a complete cycle of operation for each system.

3.05 PLACING IN SERVICE

- A. At the completion of performance tests and following approval of test result, recheck all equipment to see that each item is adequately lubricated and functioning correctly.
- B. Furnish upon completion of all work, certificates of inspections from the manufacturers stating that authorized factory engineers have inspected and tested the operation of their respective equipment and found same to be in satisfactory operating conditions.

3.06 CLEANING AND ADJUSTING

- A. During the progress of the work, clean up and remove all oil, grease, and other debris caused by the work performed under this Section.
- B. At the conclusion of the project, clean and repair all areas and finishes as installed or affected by this installation of work under this Section.
- C. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and new filters shall be installed after all construction dirt has been removed from the building. System shall be maintained in this clean condition until final acceptance. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. Control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.
- D. Variable frequency drives (VFD) shall be adjusted and set-up to lock out any frequencies that cause a resonance or vibration. To test for this, slowly increase and decrease the speed between minimum and maximum while noting all frequencies that cause problems.

3.07 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. All operating equipment installed under this section shall be placed in operation and shall function continuously in an operating test for a period of one week without shutdown due to mechanical failure or necessity of adjustment. Prior to scheduling the Project Final Inspection and after completion of all installation and running adjustments, the HVAC Subcontractor shall perform all work required to place the equipment in complete operating condition to meet all requirements under this Specification.
- B. During this running test period, the HVAC Subcontractor shall deliver to the designated representative of the Owner, through the Architect, six complete sets of operating, service and replacement data for all equipment which will require operating maintenance or replacement and one copy of this literature shall be available during the instruction of the operating personnel while the other is checked for completeness by the Architect.

3.08 TRAINING

- A. Conduct a training course for the maintenance and operating staff. The training shall start after the system is functionally complete but before the final acceptance tests. The training shall include all of the items contained in the operating and maintenance instructions as well as demonstrations of routine maintenance operations. The Owner's Representative shall be given at least two weeks advance notice of such training.
- B. During all working hours of the one week operating test, the HVAC Subcontractor's instruction personnel shall be available for and provide thorough and detailed training to the Owner's operating and maintenance personnel in operation, maintenance and adjustment of all equipment installed. The instructions shall be video taped by the Subcontractor. The master tape and one (1) copy shall be turned over to the Owner not more than 10 days following the completion of the training.
- C. Give sufficient notice to the designated operating personnel of the owner in advance of this period. Upon completion of instruction, obtain from such representatives written verification on that which the above mentioned instruction has been performed, such verification to be forwarded to the Architect.
- D. Provide instruction time of 4 hours for systems and an additional 8 hours for ATC.

END OF SECTION

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SECTION 15900

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SECTION 15900
BUILDING AUTOMATION SYSTEM

PART 1 - GENERAL

1.00 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary, and Special Conditions, Division 1 - General Requirements, Section 15500 HVAC, and Division 16- Electrical, apply to work specified in this section. This Subcontractor is bound by the provisions of these Divisions and Sections and must familiarize himself with the terms of the above documents.

1.01 QUALIFICATIONS OF BIDDER

- A. All bidders must be building automation contractors in the business of installing direct digital control building automation systems for a minimum of 5 years.
- B. Bidder must have an office within 100 miles of the job site staffed with factory-trained engineers capable of trouble shooting and maintaining all systems for the project.
- C. All bidders must be authorized distributors or branch offices of the manufacturers specified.
- D. All bidders must have a trained staff of application engineers, who have been certified by the manufacturer in the configuration, programming and service of the automation system. The Installer shall have successfully completed the Control Systems Manufacturer's classes on the control system he is to install. The Installer shall present for review the certification of completed training, including the hours of instruction and course outlines upon request. All systems design and programming shall be done by the bidder's staff and not subcontracted to a third party.
- E. Acceptable Vendors: The below listed vendors are acceptable providing they meet the requirements of these specifications. Any proposed deviations from these specifications or drawings shall be highlighted in the bid form or attached proposal and agreed to in writing by the Owner and Engineer prior to acceptance of the bid. No deviations will be allowed after that time. The BAS shall be capable of interface with existing Landis & Gyr 600 system as well as Trane Trace.
- F. The above list of manufacturers applies to operator workstation software, controller software, custom application programming language, Building Network Controllers, Custom Application Controllers, and Application Specific Controllers. All other products specified herein (e.g., sensors, valves, dampers, and actuators) need not be manufactured by the above manufacturers.

1.02 SCOPE OF WORK

- A. Except as otherwise noted, the control system shall consist of all Custom Application Controllers, sensors, transducers, relays, control panels, and other accessory equipment to fully provide all required control functions. Provide a complete system of electrical interlock wiring to fill the intent of the specification and provide for a complete and operable system. Except as otherwise specified, provide operators for equipment such

as dampers if the equipment manufacturer does not provide these. Coordinate requirements with the various Contractors.

- B. The BAS contractor shall review and study all HVAC drawings and all mechanical and electrical specifications to familiarize him with all equipment and sequences. BAS contractor shall provide all the required quantities and types of devices necessary to completely perform all sequences, whether or not such devices are explicitly shown on the drawings or specified. If any devices are not specified they shall be of the same high quality of specified components.
- C. All interlocking, wiring and installation of control devices associated with the equipment to be controlled shall be provided under this Contract. When the BAS system is fully installed and operational, the BAS Contractor and representatives of the Owner will review and check out the system and train the Owner's personnel. At that time, the BAS contractor shall demonstrate the operation of the system and prove that it complies with the intent of the drawings and specifications. The BAS contractor shall carry 10 hours of additional on-site programming to allow for field modifications that may be needed to optimize the various systems to fully conform to the requirements of these specifications and work with the actual operating conditions as installed.
- D. The buildings are to be commissioned and contractor shall provide all labor required to fully test and demonstrate that all systems operate as designed.
- E. The Contractor shall furnish and install a complete building automation system including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as called for in this specification. At a minimum, provide controls for the following:
 - 1. Interface with existing controls.
 - 2. Supply, make-up air, and exhaust air handling units.
 - 3. Supply, exhaust and return air fans.
 - 4. Power and control wiring to all DDC devices, BAS panels, etc.
 - 5. All completed acceptance testing documentation. This is a separate submission prior to job completion.
 - 6. Subcontractor Project Completion Certificate for the control system.
- F. Provide services and manpower necessary for testing of system in coordination with the HVAC Contractor, Balancing Contractor and Owner's representative and in accordance with the acceptance testing plan and functional performance test narratives.
- G. All work performed under this section of the specifications shall comply with all codes, laws and governing bodies. If the drawings and/or specifications are in conflict with governing codes, the Contractor shall submit a proposal with appropriate modifications to the project to meet code restrictions. If this specification and associated drawings exceed governing code requirements, the specification will govern. The Contractor shall obtain and pay for all necessary construction permits and licenses.

1.03 SYSTEM DESCRIPTION

- A. The existing building Automation System shall be retrofitted to accommodate new variable speed drives for AHU and Return Air fans. The Supply fan VFD's shall be controlled by duct mounted pressure differential controllers. The return fan shall track the operation of the supply fan.
- B. For this project the system shall consist of the following components:
 - 1. Custom Application Controllers (CAC):
 - a. Provide the necessary quantity and types of Custom Application Controllers to meet the requirements of the project for control of the designated mechanical equipment. All controllers shall be seamlessly integrated utilizing the same network and the same programming language.
 - b. Each controller shall be completely programmable and provide functionality based on I/O configuration rather than application. For example, the Custom Application Controllers shall have the ability to provide local lighting control.
 - c. Each CAC shall operate completely standalone, containing all of the I/O (including 15% spare points of each type) and programs to control its associated equipment.

1.04 WORK BY OTHERS

- A. The BAS Contractor shall cooperate with other contractors performing work on this project necessary to achieve a complete and neat installation. To that end, each contractor shall consult the drawings and specifications for all trades to determine the nature and extent of others' work.
- B. The BAS Contractor shall furnish all control dampers (not furnished by equipment manufacturers), control valves, sensor wells, flow meters and other similar equipment for installation by the Mechanical Contractor.
- C. The BAS Contractor shall provide field supervision to the designated contractor for the installation of the following:
- D. The Electrical Contractor shall provide:
 - 1. All power wiring to motors and to junction boxes in mechanical rooms. All power wiring from the boxes to all BAS panels and devices, regardless of location, shall be by the BAS contractor.

1.05 CODE COMPLIANCE

- A. Provide BAS components and ancillary equipment, which are UL-916 listed and labeled.
- B. All equipment or wiring used in conditioned air streams, spaces or return air plenums shall comply with NFPA 90A Flame/Smoke/Fuel contribution rating of 25/50/0 and all applicable building codes or requirements.
- C. All wiring shall conform to the National Electrical Code and the Division 16 specifications – whichever is more stringent.

- D. Comply with FCC rules, Part 15 regarding Class A radiation for computing devices and low power communication equipment operating in commercial environments.
- E. Comply with FCC, Part 68 rules for telephone modems and data sets.

1.06 SUBMITTALS

- A. All shop drawings shall be prepared in both hard copy and electronic form (in a standard format such as AutoCad 2000 or newer, or Visio Professional). In addition to the drawings, the Contractor shall furnish a CD/diskette containing the identical information. Drawings shall be B size or larger. See Section 15500 HVAC for additional requirements. Upon request, RDK Engineers will provide via email the Cadd floor plan drawings for use by the BAS contractor. The drawings are diagramatic and final floor plans and equipment locations are the responsibility of the BAS contractor.
- B. Shop drawings shall include a riser diagram and floor plans depicting locations of all controllers, routers, hubs, workstations, etc. with associated network architecture and wiring. Also included shall be individual schematics of each mechanical system showing all connected points with reference to their associated controller. "Typicals" will be allowed where appropriate. Wiring diagrams detailing interconnecting devices such as fan and pump starters, freezestats, smoke detectors, relays, etc., shall be provided for each system. Written narratives for all sequences shall be included. Any deviations from the original design shall be highlighted. A "Bill of Materials" list shall be provided for each system indicating part numbers, descriptions, manufacturer, and quantities of each component utilized.
- C. Submittal data shall contain manufacturer's data sheets on all hardware and software products required by the specification and sequences. Valve, damper, and airflow station schedules shall indicate size, type, configuration, capacity, maximum pressure rating, pressure drop, maximum differential pressure shut-off capabilities, and name and location of all equipment served.
- D. Software submittals shall contain narrative descriptions of sequences of operation, program listings, point lists, and a complete description of the graphics, reports, trends, alarms and configuration to be furnished with the workstation software. Provide complete information on user programming (commands, sequences, etc.). Information shall be bound or in a three ring binder with an index and tabs.
- E. Submit six (6) copies of submittal data and shop drawings to the Engineer for review prior to ordering or fabrication of the equipment. The Contractor shall check all documents for accuracy prior to submitting.
- F. The Engineer will make corrections, if required, and return to the Contractor. The Contractor shall then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Engineer and the submittals are fully approved.
- G. No work may begin on any segment of the project until submittals have been successfully reviewed for conformity with the design intent of the project.
- H. CAD layering standards for field coordination drawings (Division 15 & 16 requirement)
- I. Identification labels and tags, including database for equipment, valves, panels, and devices (Division 15 & 16).

- J. O&M table of contents.

1.07 SYSTEM STARTUP AND ACCEPTANCE TESTING

- A. Each point in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the BAS shall be tested against the appropriate sequence of operation. Successful completion of the system test shall constitute the beginning of the warranty period. A written report shall be submitted to the owner indicating that the installed system functions in accordance with the plans and specifications.
- B. The BAS contractor shall submit their acceptance testing plan, pre-functional performance test forms and narratives, and functional performance test forms and narratives. The BAS contractor shall be responsible for coordinating the attendees needed to demonstrate the sequence of operation performance to the Owner. The controls system will not be accepted without the prior acceptance of the submitted documents noted herein.
- C. The BAS contractor shall test and set in operating condition all equipment and systems. For major equipment such as chillers, boilers, and air handling units, this shall be done in the presence of the equipment manufacturer's representatives, as applicable, and the Owner and Architect's representatives. Coordinate with all required attendees.
- D. The BAS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The BAS Contractor shall have a trained technician available on request during the balancing of the systems. The BAS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract.

1.08 OPERATION AND MAINTENANCE MANUALS

- A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the lead time and expected frequency of use of each part clearly identified. These manuals shall be delivered to the Owner's representative within 3 months of the final approved submittals.
- B. Submit O&M table of contents in the submittal phase. O&M manuals shall be built as submittals are accepted.
- C. Each O&M document shall include the manufacturer's web site-specific O&M address for Internet access by the facility operator.
- D. The manual shall consist of (3) sets of manuals and include (3) sets of CDs, which shall contain the scanned content of the entire manual. The manual shall be submitted for review prior to creation of the CDs. The manual shall include manufacturer's Internet addresses for all equipment.
- E. The preventative maintenance shall include all tasking, frequency, and special instructions required for a proactive preventative maintenance action plan.
- F. Following project completion and testing, the BAS contractor shall submit "as-built" record drawings reflecting the exact installation of the system. The as-built documentation shall

include a copy of all application software and graphics both in written form and on CD/diskette. Documentation shall also include all BAS controls and interfaces with equipment manufacturer's controls, including as-built manufacturer's controls and sequences of operation.

1.09 WARRANTY

- A. The BAS contractor shall warrant the entire system (parts and labor) for 18 months after successful system acceptance testing is accepted by Owner's Representative. Beneficial use by the owner may be an alternative method to begin the warrantee period (providing there is a minimum of 12 months left after successful system acceptance testing and system acceptance by Owner's Representative). During the warranty period, the BAS contractor shall be responsible for all software and hardware upgrades and revisions during normal workday schedule, and within 48 hours of notification if solution cannot be resolved via the remote or web-site connection, to provide and maintain complete and workable building control systems.
- B. Updates to the manufacturer's software shall be provided at no charge during the warranty period.

PART 2 - PRODUCTS

2.00 CUSTOM APPLICATION CONTROLLERS (CAC)

- A. General: Provide Level 2 Custom Application Controllers to provide the performance specified in Part 1 of this Section. Each of these panels shall meet the following requirements.
 - 1. The Building Automation System shall be composed of one or more independent, stand-alone, microprocessor based CACs to manage the local strategies required by this project.
 - 2. The CACs shall provide communications ports for connection of the Portable Computer and Portable Operators Terminal.
 - 3. The CACs shall have sufficient memory to support its operating system, database, a minimum of 3 days of buffer (for trending data), and programming requirements with 50% spare capacity.
 - 4. All CACs shall have battery-backed real time clocks.
 - 5. The operating system of the CACs shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.
 - 6. Each CAC shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall:
 - a. Assume a predetermined failure mode.
 - b. Generate an alarm notification.
- B. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.

1. Controllers used in conditioned ambient shall be mounted in NEMA 1 type enclosures, and shall be rated for operation at 32 F to 120 F.
 2. Controllers used outdoors and/or in wet ambients shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -30 F to 150 F.
- C. CAC Operator Display: A local operator display (similar to that specified for BNCUs) shall be provided on at least one CAC or BNCU at each control panel location. The operator display shall be provided for interrogating and editing data. A system security password shall be available to prevent unauthorized use of the keypad and display.
- D. Serviceability: Provide diagnostic LEDs for power, communications, and processor. All low voltage wiring connections shall be made such that the controller electronics can be removed and/or replaced without disconnection of field termination wiring.
- E. Memory: The Controller shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.
- F. Immunity to Power and Noise: Controllers shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. The Controllers shall contain surge protection and not require any external AC power signal conditioning.

2.01 COMMUNICATIONS

- A. This project shall comprise of an ethernet network for communications between Building Network Control Units and Workstations/File Servers.
- B. The BAS subcontractor shall provide all communication media, connectors, repeaters, hubs, and routers necessary for the controls system inter-network.

2.02 DDC SENSORS AND POINT HARDWARE

- A. Pressure Sensors
1. Air pressure measurements in ranges up to 0 to 10" water column will be accurate to +/- 0.4% of range using a solid-state sensing element. Select the smallest range applicable to the use of the sensor. Sensors shall be bi-directional for room pressure monitoring. Acceptable manufacturers include Ashcroft Inc., Modus Instruments, Setra and Mamac.
 2. Differential pressure measurements of liquids or steam shall be accurate to +/- 0.5% of range. Housings shall be NEMA 4 rated.
 3. Provide wind baffles for outdoor pressure sensor locations and indoor locations where there can be turbulence.

PART 3 - EXECUTION

3.00 CONTRACTOR RESPONSIBILITIES

- A. General
1. Installation of the building automation system shall be performed by this Contractor or his subcontractor(s). However, all installation shall be under the

personal supervision of the Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a subcontractor.

B. Access to Site

1. Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or the Owner's Representative.

C. Code Compliance

1. All wiring shall be installed in accordance with the more stringent of all applicable electrical codes, equipment manufacturer's recommendations, and wiring specifications in Division 16.

D. Cleanup

1. At the completion of the work, all equipment pertinent to this contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this contract. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.

3.01 WIRING, CONDUIT AND CABLE

- A. All wire will be copper and meet the minimum wire size and insulation class listed below:

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 volt
Communications	Per Mfr.	Per Mfr.

- B. Power and Class One wiring may be run in the same conduit. Class Two and Three wiring and communications wiring may be run in the same conduit.
- C. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.
- D. Where wiring is required to be installed in conduit, EMT, or in existing cable management systems shall be used unless indicated otherwise on the Drawings or as required by Division 16 specifications. Conduit shall be minimum 1/2 inch galvanized EMT. Set screw fittings are acceptable for dry interior locations. Watertight compression fittings shall be used for exterior locations and interior locations subject to moisture. Provide conduit seal-off fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.
- E. Flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.

- F. Junction boxes shall be provided at all cable splices, equipment termination, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasketed covers.
- G. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Teflon wiring can be run without conduit above suspended ceilings. EXCEPTION: Any wire run in suspended ceilings that is used to control outside air dampers or to connect the system to the fire management or smoke control systems shall be in conduit.
- H. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.
- I. Ethernet 10/100 Base –T network wiring shall be equivalent to Owner's premise wiring or, as a minimum, Category 5e or 6 cabling up to 300' maximum run.
- J. Fiber optic cable shall be used for runs over 300' and shall include the following sizes; 50/125, 62.5/125 or 100/140.
- K. Only glass fiber is acceptable, no plastic.
- L. Fiber optic cable shall only be installed and terminated by an experienced contractor. The BAS contractor shall submit to the Engineer the name of the intended contractor of the fiber optic cable with his submittal documents.

3.02 HARDWARE INSTALLATION

- A. Installation Practices for Wiring
 - 1. All controllers are to be mounted vertically and per the manufacturer's installation documentation.
 - 2. The 120VAC power wiring to each Ethernet or Remote Site controller shall be a dedicated run, with a separate breaker. Each run shall include a separate hot, neutral and ground wire. The ground wire shall terminate at the breaker panel ground. This circuit shall not feed any other circuit or device.
 - 3. A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.
 - 4. Wires shall be attached to the building proper at regular intervals such that wiring does not droop. Wires shall not to be affixed to or supported by pipes, conduit, ducts, etc.
 - 5. Conduit in finished areas, shall be concealed in ceiling cavity spaces, plenums, furred spaces and wall construction. Exception; metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.
 - 6. Conduit, in non-finished areas where possible, shall be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.

7. Wires shall be kept a minimum of three (3) inches from all piping.
8. Where sensor wires leave the conduit system, they are to be protected by a plastic insert.
9. Wire shall not be allowed to run across telephone equipment areas.

B. Installation Practices for Field Devices

1. Well-mounted sensors shall include thermal conducting compound within the well to insure good heat transfer to the sensor.
2. Actuators shall be firmly mounted to give positive movement and linkage shall be adjusted to give smooth continuous movement throughout 100 percent of the stroke.
3. Relay outputs shall include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.
4. For duct static pressure sensors, the high pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low pressure port shall be left open to the plenum area at the point that the high pressure port is tapped into the ductwork.

C. Enclosures

1. For all I/O requiring field interface devices, these devices where practical shall be mounted in field interface panels (FIP). The Contractor shall provide an enclosure, which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.
2. FIPs shall contain power supplies for sensors, interface relays and contactors, and safety circuits.
3. FIP enclosures shall be of steel construction with baked enamel finish, NEMA 1 rated with hinged doors and keyed locks. The enclosures shall be sized for twenty percent spare mounting space. All locks will be keyed identically.
4. All wiring to and from the FIP shall be to labeled screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.
5. All outside mounted enclosures shall meet the NEMA-4 rating.
6. The wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.

D. Identification

1. Identify all control wires with labeling tape or sleeves using words, letters, and/or numbers that can be exactly cross-referenced with as-built drawings.
2. All I/O field devices inside FIP's shall be clearly labeled.

3. Junction box covers shall be marked to indicate that they are a part of the BAS system.
4. All enclosures (including controllers), all I/O field devices (except space sensors), all control valves and actuators, all routers and other field devices that are not mounted within FIP's shall be identified as follows:
 - a. Identification shall be with bakelite nameplates. The lettering shall be in white against a black or blue background, be keyed to the as built drawings, and indicate that the device is a control device.

E. Location

1. The location of sensors shall be per mechanical and architectural drawings. Coordinate with installing contractor to provide appropriate straight upstream and/or downstream runs for accurate readings of mixed temperatures or flows.
2. Space humidity, carbon dioxide or temperature sensors shall be mounted away from machinery generating heat, direct light and diffuser air streams.
3. Outdoor air temperature sensors shall be mounted on the north building face directly in the outside air. Install outdoor temperature and humidity sensors with solar radiation/precipitation shields to minimize the effects of heat radiated from the building or sunlight and from rain.
4. Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.
5. Control panels used for smoke control shall be located in building life safety electric rooms, coordinate exact locations with the electrical contractor.

3.03 SOFTWARE INSTALLATION

A. General

1. The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third party software necessary for successful operation of the system.
2. The Contractor shall cooperate with the balancing Contractor and set-up Global Override Commands as required to expedite balancing of air handling and pumping systems. Overrides (to open VAV boxes to desired flow or to open valves) shall be set-up for each system by floor and/or wing so that the total amount of flow can easily be set to equal the desired flow of the central equipment.

- B. Database Configuration: The Contractor shall provide all labor to configure those portions of the database that are required by all systems and their respective sequence of operation.

3.04 SYSTEM STARTUP AND ACCEPTANCE TESTING

- A. Cooperate and coordinate with all trade contractors in the start-up of all BAS controlled and monitored equipment, as well as during the testing, balancing, and acceptance of the

systems. Work with the balancing contractor to verify readings from the BAS agree with field measurements (such as VAV box flows) and that final set points for items such as differential pressure sensors (for VFD control) are not too high or too low for all downstream components to reach design flow.

- B. Point to Point Checkout: Each I/O device (both field mounted and located in FIPs and FOPs) shall be inspected and verified for proper installation and functionality (such as fan status and valve positioning). A pre-functional performance test checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager for submission to the Owner's Representative.
- C. Controller and Workstation Checkout: A field checkout of all controllers and front-end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software (including automatic switching to back-up computer – where called for in specs). A pre-functional performance test checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the Owner's Representative by the completion of the project.
- D. System Acceptance Testing
 - 1. All application software shall be verified and compared against the specified sequences of operation in both normal and failure modes. Control loops shall be exercised by inducing a set point shift of at least 10% and observing whether the system successfully returns the process variable to set point. Record all test results and attach to the Functional Performance Test Results Sheets and submit to Owner's Representative.
 - 2. Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations (workstations or printers), and that any other related actions occur as defined (i.e. graphic panels are invoked, reports are generated, etc.). Submit a Functional Performance Test Results Sheet to the Owner's Representative.
 - 3. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, that the computer readings (flows, temperatures, etc.) match field readings, and that any special features work as intended. Submit a Functional Performance Test Results Sheet to the Owner's Representative.
 - 4. Perform an operational test of each third party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information. Submit a Functional Performance Test Results Sheet to the Owner's Representative.
 - 5. Perform an operational test of the web server and modem by testing all graphics and systems (including alarm acknowledgement) from remote locations. Submit a Functional Performance Test Results Sheet to the Owner's Representative.
 - 6. After the above tests have been completed and the system has demonstrated to function as specified, a 30-day performance test period shall begin. If all systems perform as specified throughout the test period, requiring only routine maintenance, submit a Functional Performance Test Results Sheet for each

system to the Owner's Representative and the BAS system shall be accepted. If any system fails during the test, and cannot be fully corrected within 8-hours, the owner may request that the performance test be repeated and delay acceptance until all systems pass.

3.05 SEQUENCES OF OPERATION

- A. Sequences of operation shall be as shown on drawings. If any items are not shown, include BAS manufacturer's standard sequences.

3.06 FINAL DOCUMENTATION

- A. Upon completion of work and prior to request for Certificate of Occupancy, Contractor shall issue a certificate stating that work has been installed generally consistent with construction documents and tested per the specifications. All submittals, test reports, as-builts and O&M manuals are to be provided for engineer's review, prior to request for engineer's completion certificates. In addition, and also prior to request for completion certificates, all punch list items must be completed to the satisfaction of the engineer. The contractor must verify that all sequences of operations and controls have been incorporated and all systems and equipment are working per the sequences of operations. A blank contractor's certificate form can be furnished by RDK Engineers upon request.

END OF SECTION

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SECTION 16000

ELECTRICAL

PART 1 - GENERAL

1.00 GENERAL PROVISIONS

- A. The GENERAL REQUIREMENTS, DIVISION 1, and BIDDING AND CONTRACT REQUIREMENTS, DIVISION 0, are hereby made a part of this Specification Section.
- B. Examine all Drawings and all Sections of the Specifications and requirements and provisions affecting the work of this Section.

1.01 SCOPE OF WORK

- A. This project includes the replacement of existing variable frequency drives presently serving the following motors; AHU-1, 2, 3, and 5; RF-1, 2, 3, 4. and the replacement of motors for AHU-1, 2, 3, and 5; RF-1 & 4. Selective demolition of existing systems shall be required.
- B. The contractor shall provide all labor required to fully test and demonstrate that all systems operate as designed.
- C. The work under this Section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:
 - 1. Identification
 - 2. Raceways and Conduit
 - 3. Wire and Cable (600V)
 - 4. Junction Boxes, Pull Boxes and Wireways
 - 5. Variable Frequency Drives (Installation Only)
 - 6. Wire and Cable (above 600V)
 - 7. Supervision and Approval
 - 8. Electrical Connections to HVAC Equipment and other Equipment provided under other Sections or by Owner.
 - 9. Relocation of existing electrical components that interfere with new construction and removal and disposal of obsolete components.
 - 10. Testing
 - 11. Shop drawings
 - 12. Record (as-built) drawings
- D. Work of this Section is generally shown on the Electrical Drawings.

1.02 RELATED WORK

- A. Principal classes of Work related to the Work of this Section are listed in the Specification Table of Contents, and are specified to be performed under the indicated Sections of the Specifications. Refer to the indicated Sections for description of the extent and nature of the indicated Work, and for coordination with related trades. This listing may not include all related Work items. It is the responsibility of the Contractor to coordinate and schedule the Work of this Section with that of all other trades.
- B. The following work is not included in this section and will be provided under other sections:

1. Furnishing and installation of motors.
2. Automatic Temperature Control and Direct Digital Communication wiring except as noted on Drawings.

1.03 PRODUCTS INSTALLED AND WIRED, BUT NOT FURNISHED UNDER THIS SECTION

A. Install and provide wiring connections for the following items furnished under other sections:

1. Variable Frequency Drives

1.04 DEFINITIONS

A. As used in this Section, the following items are understood to have the following meaning:

1. **"Contractor or Subcontractor"**, unless otherwise qualified, shall mean the installer of the work specified under this Section.
2. **"Furnish"** shall mean purchase and deliver to the project site, complete with every necessary appurtenance.
3. **"Install"** shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting and proper operation at the proper location in the project.
4. **"Provide"** shall mean "Furnish" and "Install".
5. **"Work"** shall mean all labor, materials, equipment, apparatus, controls, accessories and all other items required for a proper and complete installation.
6. **"Concealed"** shall mean hidden from sight in chases, furred-in spaces, shafts, hung ceilings, embedded in construction or in a crawl space. Areas to be concealed as part of tenant alterations to the building shall also be considered in this definition.
7. **"Exposed"** shall mean not installed underground or concealed as defined above.
8. **"Furnished by Others"** shall mean materials or equipment purchased and set in place under other sections of the general contract and connected to the systems covered by this section of the specifications by this trade contractor.
9. **"Owners Representative"** shall be the party responsible to make decisions regarding all contractual obligations in reference to the Scope of Work for the Owner.
10. **"Date of Substantial Completion"** shall indicate the date where the work has been formally accepted as evidenced by completed final punch list or where the work has reached the stage that the owner obtains beneficial use and commences utilization of the installed systems for business or occupancy purposes. The GENERAL REQUIREMENTS, DIVISION 1, shall supersede this definition where specifically defined.

1.05 CODES, REFERENCES AND PERMITS

A. Materials, installation of systems and equipment provided under this section shall be done in strict accordance with the Department of Public Safety, Department of Environmental Protection, State Building Code and any other Codes and Regulations having jurisdiction including but not limited to:

1. All Applicable NFPA Standards
2. National Electrical Code (NEC).
3. Occupational Safety and Health Administration (OSHA)
4. State and Local Building Codes
5. Underwriters' Laboratories, Inc (UL)

- B. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform with the latest governing edition of the following standards, codes, specifications, requirements, and regulations, except when more rigid requirements are specified or are required by applicable codes but not limited to:
1. American National Standards Institute (ANSI)
 2. American Society of Mechanical Engineers (ASME).
 3. American Society of Testing and Materials (ASTM)
 4. Institute of Electrical and Electronics Engineers (IEEE)
 5. Insulated Cable Engineers Association (ICEA)
 6. National Electrical Contractors Association (NECA)
 7. National Electric Manufacturers Association (NEMA)
 8. Thermal Insulation Manufacturers Association (TIMA)
- C. Codes, laws and standards provide a basis for the minimum installation criteria acceptable. The drawings and specifications illustrate the scope required for this project, which may exceed minimum codes, laws and standards.
- D. Give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from authorities having jurisdiction. Deliver all certificates of inspection to the authorities having jurisdiction. No work shall be covered before examination and approval by the Owner's Representative, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work to conform to requirements, satisfactory to Owner's Representative, and without extra cost to the Owner. If work is covered before inspection and approval, this Contractor shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.06 GENERAL REQUIREMENTS

- A. Nameplates
1. Each major component of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the equipment.

1.07 MATERIAL AND EQUIPMENT STANDARDS

- A. Where equipment or materials are specified with the name of a manufacturer, such specification shall be deemed to be used for the purpose of establishing a standard for that particular item. No equipment or material shall be used unless previously approved by the Owner's Representative.
- B. Substitutions may be offered for review provided the material, equipment or process offered for consideration is equal in every respect to that indicated or specified. The request for each substitution must be accompanied by complete specifications together with drawings or samples to properly appraise the materials, equipment or process. The contractor shall highlight and list all applicable specification requirements which the substituted material deviates from.
- C. If a substitution of materials or equipment in whole or in part is made, this Contractor shall bear the cost of any changes necessitated by any other trade as a result of said substitution.
- D. All materials, equipment and accessories provided under this section shall be new and unused products of recognized manufacturers as approved.

1.08 SUBMITTALS

- A. Conform to the requirements of Division 1, General Conditions, for schedule and form of all submittals unless specifically noted otherwise in this section. Coordinate this submittal with submittals for all other finishes. Shop drawings and design layouts shall be prepared by licensed installing contractors

and shall note the name(s), license number(s) and license expiration date(s) of the contractor(s) installing electrical systems.

B. Definitions:

1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than indicated in the Contract Documents.
2. Acceptable Manufacturers: The mechanical design for each product is based on the single manufacturer listed in the schedule or shown on the drawings. In Part 2 of the specifications, certain Alternate Manufacturers are listed as being acceptable. In addition, the MATERIAL AND EQUIPMENT STANDARDS paragraph potentially allows for substitutions as being acceptable. These are acceptable only if, as a minimum, they:
 - a. Meet all performance criteria listed in the schedules and outlined in the specifications. For example, to be acceptable, an emergency generator must deliver equal kW / kVA at equal or greater efficiency using equal or less fuel as the emergency generator listed in the schedules.
 - b. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either the space or the product. Clearances to walls, ceilings, and other equipment will be at least equal to those shown on the design drawings. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Engineer has determined that the manufacturer's products will fit within the available space – this determination is solely the responsibility of the contractor.

C. Submittal Procedures, Format and Requirements

1. Review submittal packages for compliance with Contract Documents and then submit to Owner's Representative for review. Submit enough sets of shop drawings such that, after review, two sets will be kept by the reviewer, with only the remaining sets returned with reviewer's marks and comments.
2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
 - a. Title
 - b. Equipment number
 - c. Name and location of project
 - d. Names of Owner, Engineer and Seller
 - e. Names of manufacturers, suppliers, vendors, etc.
 - f. Date of submittal
 - g. Whether original submittal or resubmitted
3. Shop Drawings showing manufacturer's product data shall contain detailed dimensional (where physical clearance could be an issue).
4. Submit accurate and complete description of materials of construction, manufacturer's published performance characteristics, sizes, weights, capacity ratings (performance data, alone, is not acceptable), electrical requirements, starting characteristics, wiring diagrams, and acoustical performance for complete assemblies. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.
5. The Owner's Representative shall approve all materials before commitment for materials is made.

- D. Product Data: Submit complete manufacturer's product description and technical information including:
1. Identification
 2. Raceways and Conduit
 3. Wire and Cable (600V)
 4. Junction Boxes, Pull Boxes and Wireways
 5. Identification, labels and tags, including database for all equipment, and devices.
 6. O&M table of contents
- E. Submit shop drawings and product data grouped to include complete submittals of related systems, products and accessories in a single submittal.
1. Do not submit multiple product information in a single bound manual.
 2. Three-ring binders shall not be accepted.
- F. Deviations:
1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the deviation to the attention of the Owner's Representative.
 2. Without letters flagging the deviation to the Owner's Representative, it is possible that the Engineer may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Owner's Representative, the Seller shall hold the Engineers, his consultants and the Owner harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Engineer has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.
 3. Approval of proposed deviations, if any, will be made at discretion of Engineer.
- G. Schedule: Incorporate shop drawing review period into construction schedule so that Work is not delayed. This subcontractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule. Allow at least 10 working days, exclusive of transmittal time, for review each time shop drawing is submitted or resubmitted with the exception that 20 working days, exclusive of transmittal time are required for the following:
1. If more than five shop drawings of a single trade are received in one calendar week.
- H. Responsibility
1. Intent of Submittal review is to check for capacity, rating, and certain construction features. The contractor shall ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with approved submittals to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of Contract Documents. The Engineer's noting of some errors while overlooking others will not excuse the contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.
 2. Inform subcontractors, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.
- I. In the event that the contractor fails to provide Shop Drawings for any of the products specified herein:

1. The contractor shall furnish and install all materials and equipment herein specified in complete accordance with these Specifications.
 2. If the contractor furnishes and installs material and/or equipment that is not in complete accordance with these Specifications, he shall be responsible for the removal of this material and/or equipment. He shall also be responsible for the replacement of this material and/or equipment with material and/or equipment that is in complete accordance with these Specifications, at the direction of the Owner's Representative.
 3. Removal and replacement of materials and/or equipment that is not in complete compliance with these Specifications shall be done at no extra cost to the Owner.
 4. Removal and replacement of materials and/or equipment that is not in complete compliance with these Specifications shall not be allowed as a basis for a claim of delay of completion of the Work.
- J. Mark dimensions and values in units to match those specified.
- K. Submit Material Safety Data Sheets (MSD) on each applicable product with submittal.

1.09 RECORD DRAWINGS

- A. Refer to DIVISION 1, General Conditions, for record drawings and procedures to be provided under this section, unless specifically noted otherwise in this section.
- B. Record Drawings (red-line drawings) will be updated by this Contractor daily for review with the monthly requisition. The record drawing shall be an accurate depiction of the systems as completed, including dimensions (vertical/horizontal) of concealed components off fixed building elements.
- C. The Electrical Foreman shall maintain complete and separate set of prints of Contract Drawings at job site at all times and shall record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design.
- D. Record Drawings, shall show "as-built" condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and model numbers of final equipment installation.
- E. The Electrical Contractor shall submit the record set for approval by the engineer a minimum of four weeks prior to seeking the permanent certificate of occupancy.

1.10 WARRANTIES

- A. Submit manufacturer's standard replacement warranties for material and equipment furnished under this Section. Such warranties shall be in addition to and not in lieu of all liabilities which the manufacturer and the Electrical contractor may have by law or by provisions of the Contract Documents.
- B. All materials, equipment and work furnished under this Section shall be guaranteed against all defects in materials and workmanship for a minimum period of one-year (1) commencing with the Date of Substantial Completion. Where individual equipment sections specify longer warranties, provide the longer warranty. Any failure due to defective material, equipment or workmanship which may develop, shall be corrected at no expense to the Owner including all damage to areas, materials and other systems resulting from such failures.
- C. Guarantee that all elements of each system meet the specified performance requirements as set forth herein or as indicated on the Drawings.
- D. Upon receipt of notice from the Owner of the failure of any part of the systems during the warranty period, the affected parts shall be replaced. Any equipment requiring excessive service shall be considered defective and shall be replaced.

1.11 COORDINATION

- A. Refer to Division 1, General Conditions, for coordination requirements applicable to this section, unless specifically noted otherwise in this section.
- B. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as required.
- C. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other Sections. Any conflicts shall be referred immediately to the Owner's Representative for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Owner's Representative's satisfaction at no expense to the Owner.
- D. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section may interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. Prepare and submit for approval 3/8" scale or larger working drawings and sections, clearly showing how the work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.
- E. Keep fully informed as to the shape, size and position of all openings required for all apparatus, conduit, cable, sleeves, etc., and give information in advance to allow construction of required openings. Furnish all sleeves, pockets, supports and incidentals, and coordinate with the General Contractor for the proper setting of same.
- F. All distribution systems which require pitch or slope such as condensate drains and water piping shall have the right of way over those which do not. Confer with other trades as to the location of pipes, ducts, lights and apparatus and install work to avoid interferences.
- G. Make reasonable modifications in the work as required by structural interferences, or by interference with work of other trades, or for proper execution of the work without extra charge.

1.12 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. It is the intention of the Specifications and Drawings to call for complete, finished work, tested and ready for continuous operation. Any apparatus, appliance, material or work not shown on the Drawings, but mentioned in the Specifications or vice-versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be provided by this Contractor without additional expense to the Owner.
- B. The Drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the project and shall have the approval of the Owner's Representative before being installed. This Contractor shall follow Drawings, including his shop drawings, in laying out work and shall check the Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Owner's Representative before proceeding with the installation. This Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- C. Size of conduits, raceways and methods of running them are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the true intent and purpose of the Drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge. All work shall be installed in an approved workmanlike manner.

1.13 INSPECTION OF SITE CONDITIONS

- A. Prior to submission of bid, visit the site and review the related construction documents to determine the conditions under which the Work has to be performed and send a report, in writing, to the Owner's Representative, noting any conditions which might adversely affect the Work of this Section of the Specifications.

1.14 SURVEY AND MEASUREMENTS

- A. Base all required measurements, horizontal and vertical, from referenced points established WITH the Owner's Representative. The Electrical Contractor shall be responsible for correctly laying out the Work required under this Section of the Specifications.
- B. In the event of discrepancy between actual measurements and those indicated, notify the Owner's Representative in writing and do not proceed with the related work until instructions have been issued.

1.15 DELIVERY, STORAGE AND HANDLING

- A. No materials shall be delivered or stored on site until corresponding Shop Drawings have been approved.
- B. All manufactured materials shall be delivered to the site in original packages or containers bearing the manufacturer's labels and product identification.
- C. Protect materials against dampness. Store off floors, under cover and adequately protected from damage.
- D. Inspect all equipment and materials, upon receipt at the job site, for damage and conformance to approved shop drawings.

1.16 PROTECTION OF WORK AND PROPERTY

- A. This Contractor shall be responsible for the care and protection of all work included under this Section until the completion and final acceptance of this Contract.
- B. Protect all equipment and materials from damage from all causes including, but not limited to, fire, vandalism and theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal material or equipment at no additional cost to the Owner.
- C. Protect all equipment, outlets and openings with temporary plugs, caps and covers. Protect work and materials of other trades from damage that might be caused by work or workmen under this Section and make good damage thus caused.
- D. Damaged materials are to be removed from the site; no site storage of damaged materials will be allowed.

1.17 SUPERVISION

- A. Supply the service of a competent Supervisor with a minimum of 5 years experience in Electrical construction supervision who shall be in charge of the Electrical work at the site.

1.18 SAFETY PRECAUTIONS

- A. Life safety and accident prevention shall be a primary consideration. Comply with all of the safety requirements of the owner and OSHA throughout the entire construction period of the project.
- B. Furnish, place and maintain proper guards and any other necessary construction required to secure safety of life and/or property.

1.19 SCHEDULE

- A. Construct work in sequence under provisions of Division 1 and as coordinated with the Owner's Representative.

1.20 CUTTING AND PATCHING

- A. Provide all cutting and patching necessary for the proper installation of work to be performed under this Section.

- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. Fit around, close up, repair, patch, and point around the work specified herein to match the existing adjacent surfaces and to the satisfaction of the Owner's Representative.
- D. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment which is part of this Section of the Specifications.
- E. All of this work shall be carefully done by workmen qualified to do such work and with the proper and smallest tools applicable.
- F. Any cost caused by defective or ill-timed work required by this Section of the specifications shall be borne by this Contractor.
- G. When, in order to accommodate the work required under this Section of the specifications, finished materials of other trades must be cut or fitted, furnish the necessary drawings and information to the trades whose materials must be cut or fitted.

1.21 SLEEVES, INSERTS AND ANCHOR BOLTS

- A. Coordinate with other trades the location of and maintaining in proper positions, sleeves, inserts and anchor bolts to be supplied and/or set in place under this section of the specifications. In the event of incorrectly located preset sleeves, inserts and anchor bolts, etc., all required cutting and patching of finished work shall be done under this section of the specifications.

1.22 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

- A. Provide all supplementary steel, factory fabricated channels and supports required for the proper installation, mounting and support of all Electrical equipment, piping, etc., required by the Specifications.
- B. Supplementary steel and factory fabricated channels shall be firmly connected to building construction in a manner approved by the Owner's Representative as shown on the drawings or herein specified.
- C. The type and size of the supporting channels and supplementary steel shall be determined by the Contractor and shall be of sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.
- D. All supplementary steel and factory fabricated channels shall be installed in a neat and workmanlike manner parallel to the walls, floors and ceiling construction. All turns shall be made with 90 degree and 45 degree fittings, as required to suit the construction and installation conditions.
- E. All supplementary steel including factory fabricated channels, supports and fittings shall be galvanized steel, aluminum or stainless steel where exposed or subject to rust producing atmosphere. Factory fabricated channels shall be manufactured by Unistrut, H-strut, Powerstrut or approved equal.

1.23 HAZARDOUS MATERIALS

- A. Where it has been identified that asbestos-containing material exists within the scope limits, refer to the Asbestos Abatement specification section for requirements.

1.24 ACCESSIBILITY

- A. All work provided under this Section of the Specification shall be installed so that parts requiring periodic inspection, maintenance and repair are accessible. Work of this trade shall not infringe upon clearances required by equipment of other trades, especially code required clearances to electrical gear. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Owner's Representative.

1.25 PROJECT CLOSEOUT

A. Construction Observations by the Engineer

1. The engineer is contracted to make **periodic** progress site visits during construction, **one** substantial completion (punch list) site visit for determining substantial completion and **one** Final inspection visit to determine if all work is complete.
2. The Sub Contractor and the General Contractor are required to inspect their own work and make any corrections to the work to comply with the specifications and the contract documents. It is not the responsibility of the engineer to develop lists of incomplete work items.
3. Progress Site Visits
 - a. The purpose of the progress site visit by the engineer is to observe if the work is proceeding in accordance with the contract documents.
 - b. The engineer will prepare a field report which will note in general the work completed since the last observation visit, work found not to be in accordance with the contract documents and work not corrected since the previous observation visit.

B. Substantial Completion

1. When the Subcontractor considers the Work under this Section is substantially complete, the subcontractor shall submit written notice, through the General Contractor, with a detailed list of items remaining to be completed or corrected and a schedule of when each remaining work item will be completed. Should the engineer determine the list of remaining work does not constitute substantial completion the engineer will notify the Architect and/or Owner and he will not make a substantial completion site visit.
2. The following items shall be submitted and approved by the Engineer prior to the written request for substantial completion inspection:
 - a. Certification of successful operation of all systems.
 - b. Training of the owner's personnel in the operation of the systems.
 - c. Record Drawings in accordance with the contract specifications.
 - d. Operation and Maintenance manuals.
 - e. Testing reports.
 - f. Manufacturer's certificates of approvals.
 - g. Emergency contact list for reporting of malfunctioning equipment during the warranty period.
 - h. Contractors Project Completion certificate.
3. Should the Engineer, during the substantial completion visit, observe that the Work is substantially complete, s/he will provide a written listing of the observed deficiencies referred herein as the Punch List. The Punch List will provide for a place for the subcontractor and general contractor to sign off and date each item individually indicating that the observed deficiency item has been corrected.
4. Should the Engineer, during the substantial completion site visit, observe that the Work is not substantially complete, s/he will provide, a written list of the major deficiencies and a reason for the work not being considered substantially complete.
5. If the work is found not to be substantially complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the Subcontractor through the contractual agreement for any further observations by the engineer.
6. The Subcontractor shall remedy all deficiencies listed in the punch list within the time frame required by the contract.

C. Engineers Construction Completion Certification

1. Where required by the applicable code, the Engineers Construction Completion Certification will be issued by RDK Engineers when all life safety and health related issues are complete, all required functional tests are complete and all reports are complete.
2. There shall be NO outstanding items identified on the punch list for scope within any of these categories.

D. Final Completion

1. The following items shall be submitted prior to the written request for Final completion:
 - a. Revised Substantial Completion items to be resubmitted in accordance with the review process comments.
 - b. Warranties commencing the date of Substantial completion
 - c. Individual Signed and dated Punch List acknowledging completion of all punch list items
2. When the Subcontractor considers all of the punch list work items complete, the subcontractor shall submit written notice through the General Contractor that all Punch List items are complete and resolved and the work is ready for final inspection. The signature lines for completion of each punch list item shall be signed by the Subcontractor indicating the work is complete and signed by the General contractor indicating s/he has inspected the work and found it to be complete. Should the Engineer find the work to be finally complete and all Punch List items are complete the Engineer will make a recommendation to the Architect or Owner. If the Engineer has found the punch list work to be incomplete during final inspection a written listing of the observed deficiencies will be prepared by the Engineer.
3. If the work is not fully complete then the engineer shall be reimbursed for his time to reobserve the work. A reobservation fee shall be charged to the subcontractor through the contractual agreement for any reobservations by the engineer.

E. Re-observation Fees

1. The re-observation fee shall be \$1200.00 per visit.

F. Subcontractor's Project Completion Certificate

1. Upon completion of work and prior to request for Certificate of Occupancy, the Subcontractor shall issue a certificate stating that work has been installed generally consistent with construction documents and all applicable codes. RDK Engineers can furnish a blank contractor's certificate form upon request. The certificate shall certify:
 - a. Execution of all work has been in accordance with the approved construction documents.
 - b. Execution and control of all methods of construction was in a safe and satisfactory manner in accordance with all applicable local, state and federal statutes and regulations.
2. The certificate shall include the following information:
 - a. Project.
 - b. Permit Number.
 - c. Location.
 - d. Construction Documents.
 - e. Date on Plans and Specifications submitted for approval and issuance of the Building Permit.

- f. Addendum(a) and Revision Dates.
- 3. The certificate shall be signed by the Subcontractor and include the following:
 - a. Signature.
 - b. Date.
 - c. Company.
 - d. License Number.
 - e. License Expiration Date.

PART 2 - PRODUCTS

2.00 IDENTIFICATION

- A. Nameplates
 - 1. Nameplates shall be laminated black Bakelite with minimum 1/4" high white recessed letters.
 - 2. Nameplates shall be securely attached to the equipment. Utilize mechanical fasteners such as galvanized steel or brass screws for exterior applications. High strength adhesives or cements may be used for interior applications.
 - 3. Equipment panel and valve bar code labels shall be 4" by 2½" and designed to withstand temperatures of -22°F to +392°F. Labels are design ed to be resistant to water, acid/solvent, dirt and oil repellant. Labels shall be high tensile Graphiplast® tearing strength as well as scratch resistant and affixed to equipment by cable ties or adhesive clear pouch. Location of label shall be at unit control panel, next to factory nameplate, lower right-hand corner of panel, and/or tie wrapped to localize disconnect at unit. Installation instructions shall be provided with the labels to assure durability (i.e., clean surface prior to adhering adhesive label, leave cable ties loose on outside of equipment to allow freedom of movement due to the elements, etc.) and with adhesive tags not secured when temperatures are below 45°F ambient temperature.

2.01 RACEWAYS AND CONDUIT

- A. Rigid Galvanized Steel (RGS) Conduit
 - 1. RGS shall be zinc-coated steel that conforms to ANSI C80.1, UL Specification No. 6 and Federal Specification WW-C-581e by Allied Tube and Conduit, Republic Steel, Wheatland Tube or approved equal.
 - 2. RGS fittings shall be threaded. Split couplings or non-threaded fittings shall not be used.
 - 3. Nipples and Close Nipples shall be RGS, length as noted or as required to conform to field conditions.
- B. Intermediate Metal Conduit (IMC)
 - 1. IMC shall be zinc-coated steel that conforms to ANSI C80.6, UL Standard No. 1242 and Federal Specification WW-C-581e by Allied Tube and Conduit, Wheatland Tube or approved equal.
 - 2. IMC fittings shall be threaded.
- C. Electrical Metallic Tubing (EMT)
 - 1. EMT shall be zinc-coated steel that conforms to ANSI C80.3, UL Standard No. 797 and Federal Specification WW-C-563 a by Republic Steel, Allied Tube and Conduit or approved equal.

2. EMT fittings shall be
 - a. zinc plated pressed steel gland and ring compression
- D. Miscellaneous Conduit Fittings
 1. Elbows shall be standard radius unless noted otherwise. Where Large Radius elbows are specified, provide 48" radius unless noted otherwise.
 2. Bushings shall be threaded pressed steel hot dipped galvanized with conduit end stop and integrally molded noncombustible phenolic insulated surface rated for 150°C.
 3. Bonding bushings shall be threaded pressed steel hot dipped galvanized with conduit end stop and integrally molded noncombustible phenolic insulated surface rated for 150°C with a lay-in tin plated copper grounding lug.
 4. Exposed conduit expansion fittings shall be hot-dipped galvanized malleable iron with external bonding jumper equal to O.Z./Gedney Type EX for RGS or Type TX for EMT (4" maximum expansion).
- E. Flexible Metallic Conduit
 1. Liquidtight Metal Conduit shall be UL Listed fabricated from a spiral wound strip of heavy gauge, corrosion resistant, hot dipped galvanized steel equal to Electri-flex Company Type LA. The jacket shall be flame retarded, sunlight resistant PVC extruded over the spiral wrap. Sizes through 1 ¼" shall have an integral copper bonding strip.
 2. Liquidtight fittings shall be UL listed zinc plated insulated throat.
 3. Flexible metal conduit shall be UL Listed non-jacketed steel fabricated from a spiral wound strip of heavy gauge, corrosion resistant, hot dipped galvanized steel equal to Electri-flex Company Type BR.
- F. Wireways shall be minimum 16-gauge steel with all straight runs having hinged spring-latched covers. Finish shall be painted over a corrosion resistant phosphate pretreatment to protect against corrosion. Interior parts shall be smooth and free of sharp edges and burrs. Provide wireway as identified on the drawings for NEMA 1, 3R or 12 service. Wireways shall be equal to Square D and UL Listed.

2.02 WIRE AND CABLE (600V)

- A. Provide single-conductor, annealed copper wire and cable with insulation rated for 600 V, of sizes specified and scheduled on Drawings, by General Electric, Southwire, Okonite or approved equal, for secondary service, feeders, branch and system wiring. Wire sizes shown and specified are American Wire Gauge for copper conductors.
- B. The use of aluminum conductors is not allowed.
- C. Wire #10 and larger shall be stranded; #12 and smaller shall be solid. Wire and cable shall have THWN-THHN or XHHW insulation for branch circuit and feeder conductors. Type RHWUSE shall be used for all conductors installed in below grade raceways for generator applications only.
- D. Conductor Color-coding
 1. Feeder conductors shall be color-coded. Conductors #12 and #10 shall be colored with a factory applied solid or striped compound coating (black, red, blue, brown, orange or yellow). Neutrals and equipment grounds shall have solid compound or solid color coating (white, gray and green), except that neutrals with colored stripe shall be used where required by code. Phase conductors #8 and larger with stripes, bands or hash marks shall have background color other than white, green and gray.
 2. Alternative field-applied color coding methods may be used for wire #8 or larger, with color code as specified in other sections of this specification. Coloring shall be applied by the use of flame-retardant vinyl tape, equal to 3M Scotch 35.

E. Splices and Terminations

1. Ampacity and temperature rating of splices and connectors shall be equal to or greater than those of associated wires and cables.
 2. Make splices in branch circuit or feeder wiring from #12 to #10 with UL-listed, solderless screw on connectors rated 600 V.
 3. Make splices in branch circuit or feeder wiring above #10 with UL-listed 90°C, 600V, compression butt splice barrel equal to Burndy YS-L HYLINK.
 4. Conductor terminations shall be standard bolt-on lugs with hex screws listed for attachment of copper wire and cable to panelboards, switchboards, disconnect switches and other electrical equipment.
 5. Make terminations for stranded conductors on screw terminals with UL Listed 105°C, 600V PVC insulated barrel compression locking fork tongue terminal equal to Burndy TP-LF VINYLUG.
 6. Make bus terminations for conductors #6 and larger with UL-listed 90°C, 600V, compression standard barrel length lugs equal to Burndy YA-L for conductor sizes to #4/0. Connectors for cable 250 KCMil and larger shall be with UL-listed 90°C, 600V, compression long barrel length two hole lugs equal to Burndy YA-2N. Lugs shall be high conductivity seamless copper electro-tin plated for corrosion protection.
- F. Wire management shall be provided by self-extinguishing self-locking nylon ties with -65 to 350°F. range for bundling conductors.
- G. Cable pulling compounds shall be UL Listed and be suitable for use with the specified cable insulation system. The compound shall reduce the coefficient of friction, while not adding any long term issues to the installation such as premature aging of the insulation system, added flammability or drying in such a manner as to stick the cable in place in the raceway.

2.03 JUNCTION AND PULL BOXES

- A. Provide galvanized steel junction and pull boxes where indicated and as necessary to facilitate installation. Steel shall be minimum 16 gauge. Junction and pull boxes shall be of code required dimensions. Cover shall be of the same type and thickness material as the box construction.
- B. Junction and pull boxes intended for dry interior locations shall be NEMA 1 enclosures with accessible, removable screw-on covers. Covers shall be secured with corrosion-resistant screws with keyhole slots to accommodate easy removal.
- C. Junction and pull boxes intended for wet or exterior locations shall be NEMA 3R enclosures with hinged gasketed covers. Interior and exterior shall be finished with a gray enamel powder coat over the galvanized metal. Hinge shall be galvanized steel with stainless steel pin. Covers shall be secured with corrosion-resistant zinc plated lockable pull catches.
- D. Custom fabricated medium to large junction and pull boxes shall have internal structural steel bracing welded to form a rigid assembly adequate to maintain alignment and shape in shipment and installation.

PART 3 - EXECUTION

3.00 DEMOLITION

- A. General
 1. The Electrical Contractor shall visit the site before submitting his bid to familiarize himself with the existing conditions and the extent of the work. No extra compensation will be allowed for work required to be performed or to overcome existing conditions, by failure to visit the site.

2. The Electrical demolition work shall be performed by the Electrical Contractor in cooperation with the other trades and as scheduled and approved by the Owner's Representative.
3. The locations of existing equipment to remain including piping, ductwork, conduits, etc., are shown in an approximate way only. The Contractor shall determine the exact location of all existing equipment before commencing work.
4. Power outages caused by demolition that affect other areas shall be held to a minimum. Shutdowns shall be coordinated with the users and the owner. Night, weekend and/or Holiday time required to perform electrical demolition work or new electrical work shall be carried as part of the Contract Cost.

B. Scope

1. The electrical drawings illustrate the full extent of the scope of demolition. Disconnect and make safe all electrical equipment identified for removal on the Electrical, HVAC, Plumbing and Fire Protection plans. The electrical scope may extend beyond the area defined by the drawings.
2. The electrical demolition plans and details indicate the general scope and are not intended to show all items to be removed or retained. Devices and equipment located on walls and/or ceilings to be removed shall be disconnected and made safe. The electrical contractor shall notify the owner's representative of any unanticipated hidden conditions encountered during demolition.
3. The electrical contractor shall circuit trace and label all existing branch circuits and feeders within the area of demolition scope prior to de-energizing and disconnection. All circuits within panelboards identified for removal shall be traced and labeled to ensure that no area outside the demolition scope limit is affected.
4. The electrical contractor shall identify all branch circuits, feeders and system components, which are to remain within the area of demolition scope. There shall be no interruption of service to any area outside the scope limits without approval from the Owner's Representative. Existing equipment to remain shall be left in a code compliant manner.
5. The electrical contractor shall de-energize and remove all conductors and raceways to their points of origin within the area of demolition scope. Items identified for demolition shall not be abandoned in place. Raceways that enter masonry walls and floors shall be cut flush at the surface for patching by others. All circuit breakers associated with the demolition scope shall be de-energized and labeled spare.
6. The electrical contractor shall be responsible for the repair of all systems or building components damaged during the execution of the work. Damage shall include but not be limited to destruction or disposal of items intended to remain or to be salvaged.
7. The electrical contractor shall temporarily support all items to remain that are affected by the demolition of building structural components (walls, ceilings, etc.). Temporarily supported items shall be permanently supported and installed when finalized structures are in place.
8. The existing fire alarm system shall remain fully functional during the entire demolition and construction period. Reuse of existing fire alarm system raceways shall not be allowed. All required system shutdowns shall be coordinated with and approved by the Owner's Representative and the Authority Having Jurisdiction. Demolition of the existing system shall not commence until the new system has been completely installed, tested and approved by the Authority Having Jurisdiction.
9. All demolition scope associated with low voltage systems including but not limited to telephone, data, security, paging, CCTV, etc. shall be included.

C. Disposal

1. All removed items shall be legally disposed of unless identified for reuse. Refer to Part 1 of this specification for requirements for Hazardous Material disposal.

2. The Owner's Representative shall inspect all retained items prior to placement in the identified storage location by the electrical contractor. Selected items will be disposed at no additional cost to the project.

3.01 IDENTIFICATION

A. Nameplates

1. Provide nameplates on all equipment listed in other sections of this specification including but not limited to switchboards, substations, panelboards, transformers, junction and pull boxes, disconnect switches, motor starters and motor control centers, contactors, time clocks, remote control stations, fire alarm panels, smoke detector remote test/alarm stations and fire alarm annunciators.
2. Nameplates shall designate equipment tag number as defined on the drawings, system voltage where applicable, circuit number, device controlled and system function. Refer to typical nameplate detail on the drawings for additional requirements.
3. Submit a complete list of proposed nameplates prior to order to ensure conformance to design criteria. Submittal shall include nomenclature, size and layout of each tag.
4. Code 39 shall be the bar code format unless designated differently by the Owner's facility group. The contractor shall create the required bar codes and assign numbers based upon input from the owner's facility group. The contractors shall create a database of all equipment, panels and valves for owner's review and approval.
5. Samples of stickers together with color schedules shall be submitted during the submittal phase of this project.

B. Equipment Identification

1. Equipment identification designations shall be taken from equipment schedules and coordinated with the Owner's facility group to assure designations match up with Owner's maintenance management system identification database.

3.02 RACEWAYS AND CONDUIT

A. General

1. Raceways and conduits may be run exposed on unfinished walls and basement ceilings with exposed structure, in mechanical rooms, electric rooms, attics and roof spaces.
2. Run concealed raceways and conduits in as direct lines as possible with minimum number of bends of longest possible radius. Install exposed raceways and conduits parallel to or at right angles to building lines.
3. Raceway and conduit runs shall be mechanically and electrically continuous from supply to outlet. Conduit shall enter and be secured to metallic enclosures with lock nut and bushing inside. Provide additional exterior lock nut for RGS connections. Bushings shall be the bonding type for conduit connections to metallic enclosures with concentric or eccentric knockouts. Lock nuts and bushings will not be required where conduits are screwed into threaded hubs.
4. Size raceways and conduits as required by NEC unless oversized raceways and conduits are shown on the Drawings. Raceways and conduits shall be ¾" minimum.
5. Install conduit systems complete before installation of conductors. Blow through and swab after plaster is finished and dry, and before conductors are installed.
6. Raceways and conduits supports shall be rigidly attached to the building structure utilizing corrosion resistant components suitable for use with the selected raceway or conduit. Refer to the seismic restraint sections of this specification for any additional requirements.

7. Field bending, cutting and threading shall be executed with the proper tools, resulting in bends and shortened conduits and raceways that are equivalent to factory fabricated and purchased components.
 8. Provide standoff clips for conduits on exterior and wet location walls.
- B. Rigid Galvanized Steel (RGS) Conduit
1. RGS may be used for all raceway applications outlined for EMT and PVC. RGS shall be used in locations where subject to accidental damage or abuse and for all above grade exterior applications unless other wiring methods are specified on the drawings. All circuit conductors in excess of 600 V shall be installed in RGS.
 2. RGS shall not be used in corrosive environments.
 3. All RGS fittings shall be threaded. Utilize Erickson couplings where joining two threaded conduits that can not be rotated.
- C. Intermediate Metal Conduit (IMC) may be used in any application, with same requirements, where RGS is allowed except for circuits operating at more than 600 V.
- D. Electrical Metallic Tubing (EMT)
1. EMT may be used for lighting and receptacle branch circuits, telephone, fire alarm, communications, signal and instrumentation circuits and for control circuits. EMT may be used in masonry walls, above hung ceilings, in equipment rooms, in mechanical and electrical chases and closets, in exposed locations along ceilings or walls above normal traffic level and where not subject to accidental damage or abuse.
 2. EMT shall not be used in exposed applications below 8 feet above finished floor or in exterior or damp/wet/corrosive locations.
- E. Miscellaneous Conduit Fittings
1. Expansion/Deflection Fittings: Raceways and conduit buried or secured rigidly on opposite sides of building expansion joints and long runs of exposed conduit subject to expansion and contraction due to variations in temperature shall have expansion fittings. Raceways and conduit shall cross building expansion joints at right angles. Provide separate external copper bonding jumper secured with grounding straps on each end of fitting. Fittings shall safely deflect and/or expand/contract to twice the distance of potential movement.
 2. Penetrations of all below grade exterior walls and flooring shall require approval by the engineer and architect. Submit proposed penetration points, size openings and penetration methods to engineer and architect. Penetrations shall utilize sealing fittings appropriately sized for the application. Duct bank penetrations are excluded from this requirement.
 3. Sealing Fittings shall be installed wherever conduits pass from warm to cold locations to minimize condensation within the conduit. Sealing fittings shall be installed with RGS penetration of the wall and terminate in a suitably sized junction box.
 4. Refer to other specification sections for requirements pertaining to sealing for hazardous atmospheres.
- F. Flexible Metallic Conduit
1. Provide flexible metallic conduits for connections to electrical equipment and to equipment furnished under other Divisions that are subject to movement, vibration or misalignment and/or where noise transmission must be eliminated or reduced.
 2. Flexible metallic conduit shall be liquid-tight under the following conditions:
 - a. Exterior locations
 - b. Moisture or humidity-laden atmospheres

- c. Environments where seepage or dripping of water, grease, oil or other fluids is possible. All mechanical equipment rooms and penthouses, kitchens and;
 - d. Corrosive atmospheres
- G. Wireways shall be provided where specifically shown on the drawings or where the group mounting of controllers, disconnects, enclosures, etc warrant the use for elimination of multiple short conduit runs. Wireways shall be provided complete with all required appurtenances necessary to have a totally enclosed system rated for the environment. Wireways shall not be installed in any location where subject to accidental damage or abuse.

3.03 WIRE AND CABLE (600V)

- A. Install branch circuits and feeders from the power source to the attachment point as required for a complete system. Provide slack wire for connections to equipment installed by others.
- B. Install wires and cable in raceways as specified. All conductor sizing is based upon no greater than three current carrying conductors in a conduit. Installation of up to six circuits (no greater than twelve current carrying conductors) in a single conduit will be allowed if the conductor sizing is increased to the required ampacity to accommodate de-rating factors required by the NEC and NFPA 70.
- C. The minimum wire size shall be #12 unless #14 specifically allowed on the drawings for wiring of controls. Branch circuits longer than 75' for 120 V and 175' for 277 V from panel to last outlet shall be increased a minimum of one size above that shown on the drawings to minimize voltage drop to less than 2%.
- D. Conductors shall be identified at all accessible locations in the following manner:

- 1. Color code secondary service, feeders and branch circuit conductors as follows:

<u>208/120 Volts</u>	<u>Phase</u>	<u>480/277 Volts</u>
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green

- 2. Provide nonferrous wire markers, embossed or printed to correspond with the Drawings. Labels shall be permanently marked so that the source of the branch circuit or feeder may be readily identified. Hand written labels are not acceptable. Embossed tag equal to 3M Scotch Code STL-TAG or SCS-TM shall be applied with two miniature cable ties or slipped through both end holes. Heat bonded tag equal to 3M Scotch Code SCS-HB shall be permanently affixed with a heat gun.
- E. Arc-proofing shall be applied to all feeders greater than 100 Amperes where multiple circuits are installed in common enclosures such as handholes, manholes and junction boxes. Apply tape in single, half-lapped layer as required by manufacturer's recommendations. Secure with strips of red plastic film tape on 208Y/120V conductors and yellow plastic film tape on 408Y/277V conductors.
- F. Cable Pulling
 - 1. Pull cables that share conduit at same time into completely installed raceway. Conductors shall not be pulled in raceways with existing wiring.
 - 2. Submit cable pulling calculations for engineers approval prior to all mechanically assisted pulls. Attach pull ropes to conductors with basket-weave grips on pulling eyes. Provide means to measure tension during entire pull. Utilize pulling compounds to lessen friction in accordance with the manufacturer's recommendations.
 - 3. mechanically assisted pulls shall utilize equipment specifically designed for the purpose such as ropes, electric wench, pulleys, etc. The use of a motorized vehicle to assist in a cable pull is prohibited.

3.04 JUNCTION AND PULL BOXES

- A. Junction box covers shall be accessible. Do not install junction boxes above suspended ceilings except where ceiling is removable or where an access panel is provided.
- B. Pull boxes connected to concealed conduits shall be mounted with covers flush with finished wall or ceiling.
- C. Pull boxes exposed to rain or in damp/wet locations shall be weatherproof NEMA 3R unless noted otherwise on the drawings.
- D. No pull box shall be within 2 feet of another.
- E. Provide clamps, grids, cable ties and other non-conductive or combustible appurtenances to secure cables. No cable shall be unsupported for more than 30". Cables shall not touch or be unsupported within 1" of the box cover.
- F. Each junction and pull box shall have a suitable laminated plastic nameplate with white cut letters identifying power source, voltage and driven load of the associated branch circuits or feeders.
- G. Submit box sizing calculations to confirm all box dimensions are in accordance with code requirements with product data prior to installation.

3.05 BASIC ACCEPTANCE TESTS

- A. General Scope
 - 1. This section covers the required field tests and inspections to assess the suitability for initial energization of electrical power distribution equipment and systems. Failed components shall be replaced and retested for no additional cost to the project.
 - 2. The purpose of this specification is to assure that all tested electrical equipment and systems are operational and within applicable standards and manufacturer's tolerances and that the equipment and systems are installed in accordance with design specifications.
 - 3. All testing shall be performed by the contractor responsible for the installation of the systems or by an independent testing organization under contract with the contractor.
 - 4. All equipment utilized for testing shall have a valid calibration sticker. All test reports shall indicate the equipment utilized and its associated calibration due date.
 - 5. Coordinate all required shutdowns with the owner. Any and all testing required after the owner has taken occupancy (temporary or permanent) shall be assumed to be conducted during premium time.
 - 6. A written record of all tests and a final report summarizing the findings shall be submitted for approval prior to energizing any electrical power distribution equipment and systems. All equipment shall be left in clean operational condition.
- B. Inspection and Test Procedures

The following tests shall be conducted using the noted section of the latest edition of NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment Systems as a reference:

- 1. Low Voltage Cables - All feeders illustrated on the one line diagram shall be inspected and tested in accordance with the referenced standard. Visually inspect cables for physical damage, color code and proper termination.

END OF SECTION